250409 - PLAGESTRTE - Planning and Management of Transportation

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2019
Degree: MASTER’S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Compulsory)
MASTER’S DEGREE IN CIVIL ENGINEERING (PROFESSIONAL TRACK) (Syllabus 2012). (Teaching unit Compulsory)
MASTER’S DEGREE IN SUPPLY CHAIN, TRANSPORT AND MOBILITY MANAGEMENT (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: Spanish, English

Teaching staff
Coordinator: FRANCESC ROBUSTÉ ANTÓN
Others: MIGUEL ANGEL ESTRADA ROMEU, MANUEL GRIFOLL COLLS, PERE MACIAS ARAU, ADRIANA HAYDEE MARTINEZ REGUERO, FRANCESC ROBUSTÉ ANTÓN, ELISABETH ROCA BOSCH, FRANCESC SORIGUERA MARTÍ

Opening hours
Timetable: Tuesday from 16h to 20h (previous appointment is recommended). Practical cases may be presented by other instructors, which may vary each year. The calendar specifies the cases, instructors and contact details for students.

Degree competences to which the subject contributes

Specific:
8169. The ability to plan, manage and operate civil engineering infrastructure.

8208. The ability to analyse and interpret the regulation and impact of infrastructure and their repercussions for sustainable development, taking into account economic, environmental, social and cultural factors.

8234. Knowledge of transport engineering and planning, transport types and functions, urban transport, management of public transport services, demand, costs, logistics, and financing of transport infrastructure and services.

Transversal:
8559. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding the mechanisms on which scientific research is based, as well as the mechanisms and instruments for transferring results among socio-economic agents involved in research, development and innovation processes.

8562. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

8563. 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.
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Teaching methodology

The course consists of 1.4 hours per week of classroom activity (large size group) and 0.7 hours weekly with half the students (medium size group).

The 1.4 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 0.7 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.

The rest of weekly hours devoted to laboratory practice.

Material: Powerpoints, course notes and readings

Learning objectives of the subject

Students will acquire an understanding of the design and operation of modal interchange transport infrastructure, including ports, airports, rail terminals and logistics centres.

Upon completion of the course, students will be able to:

Conduct studies of transport engineering and planning, transport types and functions, urban transport, management of public services, demand, costs, logistics, and financing of transport infrastructure and services;

Analyse and interpret the regulation and impact of infrastructure and their repercussions for sustainable development, taking into account economic, environmental, social and cultural factors;

Plan, manage and operate civil engineering infrastructure.

Transport planning: Multi-modal transport and mobility; Transport systems and territorial impact; Hierarchy of transport systems; Physical limitations of transport systems: Capacity and performance; Impacts of transports systems: Environmental, physical, social, cultural, economic; Transport systems in urban areas; Localisation of economic activities; Infrastructure networks; Branch and mesh networks; Decision-making in transport and regional planning; Objectives, efficiency, sustainability, transport planning and urban planning; Journey time and short-term economic effects; Geographical information, characterisation of infrastructure and land use; Sampling and surveys; Demand modelling, econometric models; Public and private investment models, risk quantification, concessions, participating interests and management, shadow tolls; Tariff structure and profit; Management and operation of transport infrastructure and services; Private vehicles, parking, rates, service control, urban and inter-urban road infrastructure, control and ICTs; Road freight and logistics hubs; Maritime transport systems and port terminals; Air transport and airport terminals; Rail transport and rail terminals; Intermodal transport systems, international routes.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 25h 58,8m 17.32%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 13h 01,2m 8.68%</td>
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<tr>
<td></td>
<td>Hours small group: 13h 01,2m 8.68%</td>
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<tr>
<td></td>
<td>Guided activities: 1h 58,8m 1.32%</td>
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<tr>
<td></td>
<td>Self study: 96h 64.00%</td>
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</tbody>
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### 1. Territory and mobility

<table>
<thead>
<tr>
<th>Learning time:</th>
<th>124h 48m</th>
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</thead>
<tbody>
<tr>
<td>Theory classes:</td>
<td>30h</td>
</tr>
<tr>
<td>Practical classes:</td>
<td>10h</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>12h</td>
</tr>
<tr>
<td>Self study:</td>
<td>72h 48m</td>
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</tbody>
</table>

**Description:**


Infrastructure and transport vehicles. Principles drawn linear infrastructure of transportation, earthmoving, slope, layout and description of surface conditions geotechnical, structural, and hydraulic. Layout rules (3.1 IC). Security at zero flow (static) visibility distances, braking, turning radius, etc. Terminals: access, internal transfer system, platforms, waiting rooms, shops, services and amenities, capacity.


Microeconomics: production functions (axiomatic framework of Shephard),

Cost (total, unitary marginal externalities), demand, equilibrium, elasticity, road expansion, the concept of optimality (constrained optimization) utility. Market equilibrium. Pricing (pricing) infrastructure and services.

Macroeconomics: input-output tables, indirect and induced effects. Effects developing country, society. Union micro-macro (Weintraub).

Urban economy. Principles of agglomeration (or synergy), accessibility (or spatial competition), spatial interaction (or the demand for mobility), hierarchy (or the order of cities), competitiveness (or the basis of export). External economies of cities. Urban systems. Price of land. Single CBD. Multiple sub-centers. Spatial models of urban systems. Monocentric economy. Model von Thun. Emergence of new cities. Evolution of a hierarchical urban system. Size of cities. Terminals and transport hubs (ports, airports, interchanges, stations) and their location. Sustainable urban development.


Sustainable mobility. Policy (Policy) Transport, environment and sustainability. Economic and political conflict between development and ecology, between transport and environmental friendliness. Government regulation and transport policy as a facilitator of economic development, trade. International policy, including government-business relations, the role of stakeholders, sustainable development, global warming,
Qualification system

Structure: two parts, T (concepts) and C (cases). Part T takes 2/3 of the subject and includes the background, scientific issues and further readings. Part C includes professional cases, mainly related to Barcelona, trying to illustrate who the principles have (or have not) been in practice and the real life constraints that face implementations; in many cases, the classes will count with the participation of renowned professionals and experts.

Class structure:
- Subject (one or two classes)
- Objectives + References + Conclusions
- Background and description (PPT): main concepts, main formulas, tables, graphics, photos
- Professional case / application (simplified)
- Break
- Science and principles (blackboard or PPT)
- Homework / further readings / exercises / field work / data-info mining / self-evaluation mini-quiz / course notes

Evaluation: Grade = (0.5A + 2.5Q + 5M + 2R)/10
A= Attendance (attending 90% of all the classes guarantees 10 points).
Q= arithmetic average of Quizzes (theory + cases).
M= Modeling exam (exercises). M=3 to pass the subject.
R= course report (in groups of 2 students)
Continuous evaluation + re-sit. Only the best grade is considered.
Final grades (passing = 5) are magnified according to the Civil Eng. School criteria.

Teaching and learning methods, expected learning results, specific competences: See Camins OpenCourseWare.

Vertical contents: Transportation Planning and Management principles and applications. Transversal concepts: Economic and Social Territory, Sustainability, Environment, Energy, Accessibility, trade-off Supply vs Demand, trade-off Global vs Local, Functionality, TSM, etc.
Bibliography

Basic:


Complementary:


