Course guide
2500022 - GECSITRANS - Transportation Systems

Last modified: 29/09/2022

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: 2022  ECTS Credits: 6.0  Languages: Catalan, English

LECTURER

Coordinating lecturer: MIGUEL ANGEL ESTRADA ROMEU
Others: HUGO BADIA RODRÍGUEZ, MIGUEL ANGEL ESTRADA ROMEU

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14413. Capacity for the construction and conservation of roads, as well as for the dimensioning, the project and the elements that make up the basic road equipment. (Specific technology module: Civil Construction)
14414. Capacity for the construction and conservation of railway lines with knowledge to apply specific technical regulations and differentiating the characteristics of the mobile material. (Specific technology module: Civil Construction)
14422. Capacity for the construction and conservation of roads, as well as for the dimensioning, the project and the elements that make up the basic road equipment. (Specific technology module: Urban Transport and Services)
14423. Capacity for the construction and conservation of railway lines with knowledge to apply specific technical regulations and differentiating the characteristics of the mobile material. (Specific technology module: Urban Transport and Services)
14426. Knowledge of the design and operation of infrastructures for modal exchange, such as ports, airports, railway stations and transport logistics centers. (Specific technology module: Urban Transport and Services)

General:
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.
14386. Capacity for maintenance, conservation and exploitation of 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.
LEARNING OBJECTIVES OF THE SUBJECT

Knowledge of tools of analysis and evaluation of transport systems. Causal and quantitative functioning of the transport system. Design, operation and exploitation of transport terminals and infrastructures.

1. Ability to understand the causal and quantitative operation of the transport system, as well as the behavior of the different agents that compose it (users, operators and Administration / society).
2. Knowledge of the design, operation, management and control of terminals and transport infrastructure.
3. Knowledge about modal passenger exchange terminals in urban public transport systems.

Basic knowledge of the causal and quantitative functioning of the transport system, as well as the behavior of the different agents (users, operators and Administration / society). Economic impacts of infrastructure and transport services. Knowledge of analysis and assessment tools for transport systems, operational research, traffic theory, operations analysis, estimation and demand forecasting techniques, transport economics, evaluation of alternatives, system modeling and flow allocation. Knowledge of the design, operation, management and control of terminals and transport infrastructures, as well as the management of the resources necessary for their operation and of the patterns of mobility of people and merchandise and their relationship with ICTs. Service focused planning. Intermodal passenger terminals in urban public transport systems, airport terminals (land-side management, air-side management, baggage handling system), port terminals (operation of container terminals, dry and liquid bulk terminals, automobile terminals, ro-ro terminals, etc.), railway terminals and dry ports, highway terminals, logistics centers and merchandise consolidation terminals.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.00</td>
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**Total learning time**: 150 h

CONTENTS

**Transport analysis tools**

**Description:**

**Specific objectives:**
Knowledge of the operations and operation of transport infrastructures
Knowledge of analysis tools for overcoming the distance of a vehicle

**Full-or-part-time**: 38h 24m
Theory classes: 8h
Practical classes: 8h
Self study : 22h 24m
Operations in transport systems

Description:

Traffic theory. Laboratory.

Urban Mass transport. Problems

Specific objectives:
Knowledge of traffic theory for the correct analysis of vehicle operations on the road network
Correctly apply the models of management, evaluation and design of road networks to maximize the efficiency of the service to the user
Knowledge of the design, operation and operation of public transport systems
Use models to define the proper design and operation of public transport networks to maximize the efficiency of the service to the user

Full-or-part-time: 43h 12m
Theory classes: 8h
Practical classes: 4h
Laboratory classes: 6h
Self study: 25h 12m

User behavior and demand models

Description:
Introduction to transport system modeling problems

Specific objectives:
Knowledge of models for forecasting demand and flow assignment.

Full-or-part-time: 38h 24m
Theory classes: 8h
Practical classes: 8h
Self study: 22h 24m
Transport systems. Modal analysis

Description:
Capacity, benefits and level of service. Road transport: costs, road terminals, service stations, tolls.
Subsystems, elements and tasks, optimization of operations, job-scheduling, simulation. Applications: Port, airport and railway terminals.

Specific objectives:
Knowledge of the design and operation of transport terminals as well as the management of the resources necessary for their management
Knowledge of the causal and quantitative operation of the air and rail transport system.
Knowledge of the causal and quantitative operation of maritime and intermodal transport systems.

Full-or-part-time: 24h
Theory classes: 6h
Practical classes: 2h
Laboratory classes: 2h
Self study: 14h

GRADING SYSTEM

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.
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 teachings of the laboratory grade is the average in such activities.
The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

BIBLIOGRAPHY

Basic:

Complementary: