Course guide
250ST2122 - 250ST2122 - Transport of Goods

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SUPPLY CHAIN, TRANSPORT AND MOBILITY MANAGEMENT (Syllabus 2014). (Optional subject).
Academic year: 2022  ECTS Credits: 5.0  Languages: English

LECTURER
Coordinating lecturer: Miquel Estrada
Others: M. Paz Linares, José Magín Campos, Francesc Robusté

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES
Specific:
CESCTM4. Know and apply the modeling techniques and simulation optimization to solve the problems of design, operation and management of transportation systems.

TEACHING METHODOLOGY
The course approach will be based on a blending of theoretical concepts and practical issues. Theoretical concepts and practical guidelines will be the main contents of the two hours weekly lectures. Selected comprehensive collections of papers dealing with the main issues will be supplied to the students along with practical exercises that will provide a better understanding of the theoretical issues. The students will have to do an small project and individual exercises during the course.

LEARNING OBJECTIVES OF THE SUBJECT
Vertical contents: Freight transportation planning and management principles and applications.
Transversal concepts: Economic and Social Territory, City and Regional Planning, Sustainability, Environment, Routing, Scheduling, Energy, trade-off Supply vs Demand, trade-off Global vs Local, Functionality, Transportation System Management, etc.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours small group</td>
<td>15,0</td>
<td>12.00</td>
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<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>64.00</td>
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</tbody>
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Total learning time: 125 h
## CONTENTS

1. Transportation system overview

Description:
Transportation system overview. Objectives, planning, stakeholders, nature of freight, regulation, types of companies and services, atomization, logistics operators, LPI (WB).

**Full-or-part-time:** 2h
**Theory classes:** 2h

2. Distribution system design

Description:
Distribution system design. Elements, costs, network typology (hub-and-spoke, peddling, direct shipments), trade-offs.

**Full-or-part-time:** 4h
**Theory classes:** 4h

3. Transportation problems

Description:
Transportation problems. Modelling approaches (discrete-combinatorial problems, continuous-analytic models). The Hitchcock or transportation problem: formulation and solution algorithms

**Full-or-part-time:** 2h
**Theory classes:** 2h

4. Classic Transportation Problems

Description:
Classic Transportation Problems (II). Location models.

**Full-or-part-time:** 2h
**Theory classes:** 2h

5. Classic Transportation Problems (III). Routing and scheduling problems

Description:
Classic Transportation Problems (III). Routing and scheduling problems

**Full-or-part-time:** 2h
**Theory classes:** 2h

6. Long-haul freight transportation

Description:

**Full-or-part-time:** 4h
**Theory classes:** 4h
### 7. Logistics centers and freight terminals

**Description:**
Logistics centers and freight terminals. Market analysis, services supply, competition, location, accessibility, functional layout, city planning and urbanization, economics, promotion. Two-echelon problems

**Full-or-part-time:** 2h  
Theory classes: 2h

### 8. Urban freight transportation

**Description:**
Urban freight transportation. City logistics, particularities, smart and green measures.

**Full-or-part-time:** 6h  
Theory classes: 6h

### 9. Spatial interaction models and freight demand

**Description:**
Spatial Interaction models and freight demand. Type of freight, demand models, examples.

**Full-or-part-time:** 2h  
Theory classes: 2h

### 10. Simulation of urban freight distribution

**Description:**
Simulation of urban freight distribution

**Full-or-part-time:** 2h  
Theory classes: 2h

### 11. Pricing and rating

**Description:**

**Full-or-part-time:** 2h  
Theory classes: 2h

### GRADING SYSTEM

It will be based on the small project and individual exercises assigned to each student. 2 Exams (E1+E2)+ Projecte (P).  
Nota = 0.35E1+0.35E2+0.3 P
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Other resources:
ATENEA:
- Planning of the subject.
- Notes related to block contents.
- Slides presented in weekly lectures.
- Collection of papers dealing with the main issues.
- Guidelines for the individual practices.
- Tasks related to assignments.