250ST2122 - Transport of Goods

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN STATISTICS AND OPERATIONS RESEARCH (Syllabus 2013). (Teaching unit Optional)
MASTER'S DEGREE IN SUPPLY CHAIN, TRANSPORT AND MOBILITY MANAGEMENT (Syllabus 2014). (Teaching unit Optional)
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: English

Teaching staff
Coordinator: Miquel Estrada
Others: M. Paz Linares, José Magín Campos, Francesc Robusté

Opening hours
Timetable: Wednesdays from 16 to 18. Previous request via email

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>Total learning time: 125h</th>
<th>Hours large group: 30h</th>
<th>24.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 15h</td>
<td>12.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 80h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
250ST2122 - Transport of Goods
## Content

| 1. Transportation system overview | Learning time: 2h  
Theory classes: 2h |
|----------------------------------|---------------------|
| **Description:**  
Transportation system overview. Objectives, planning, stakeholders, nature of freight, regulation, types of companies and services, atomization, logistics operators, LPI (WB). |

| 2. Distribution system design | Learning time: 4h  
Theory classes: 4h |
|------------------------------|-------------------|
| **Description:**  
Distribution system design. Elements, costs, network typology (hub-and-spoke, peddling, direct shipments), trade-offs. |

| 3. Transportation problems | Learning time: 2h  
Theory classes: 2h |
|----------------------------|-------------------|
| **Description:**  
Transportation problems. Modelling approaches (discrete-combinatorial problems, continuous-analytic models). The Hitchcock or transportation problem: formulation and solution algorithms |

| 4. Classic Transportation Problems | Learning time: 2h  
Theory classes: 2h |
|-----------------------------------|-------------------|
| **Description:**  
Classic Transportation Problems (II). Location models. |

| 3. Classic Transportation Problems (III). Routing and scheduling problems | Learning time: 2h  
Theory classes: 2h |
|---------------------------------------------------------------|-------------------|
| **Description:**  
Classic Transportation Problems (III). Routing and scheduling problems |
<table>
<thead>
<tr>
<th>Course Description</th>
<th>Learning time</th>
<th>Theory classes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6. Long-haul freight transportation</strong></td>
<td>4h</td>
<td>4h</td>
</tr>
<tr>
<td><strong>7. Logistics centers and freight terminals</strong></td>
<td>2h</td>
<td>2h</td>
</tr>
<tr>
<td><strong>Description:</strong> Logistics centers and freight terminals. Market analysis, services supply, competition, location, accessibility, functional layout, city planning and urbanization, economics, promotion. Two-echelon problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8. Urban freight transportation</strong></td>
<td>6h</td>
<td>6h</td>
</tr>
<tr>
<td><strong>Description:</strong> Urban freight transportation. City logistics, particularities, smart and green measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>9. Spatial interaction models and freight demand</strong></td>
<td>2h</td>
<td>2h</td>
</tr>
<tr>
<td><strong>Description:</strong> Spatial Interaction models and freight demand. Type of freight, demand models, examples.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>10. Simulation of urban freight distribution</strong></td>
<td>2h</td>
<td>2h</td>
</tr>
<tr>
<td><strong>Description:</strong> Simulation of urban freight distribution</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Description:

- 6. **Long-haul freight transportation**
  - Learning time: 4h
  - Theory classes: 4h

- 7. **Logistics centers and freight terminals**
  - Learning time: 2h
  - Theory classes: 2h
  - Description: Logistics centers and freight terminals. Market analysis, services supply, competition, location, accessibility, functional layout, city planning and urbanization, economics, promotion. Two-echelon problems

- 8. **Urban freight transportation**
  - Learning time: 6h
  - Theory classes: 6h
  - Description: Urban freight transportation. City logistics, particularities, smart and green measures.

- 9. **Spatial interaction models and freight demand**
  - Learning time: 2h
  - Theory classes: 2h
  - Description: Spatial Interaction models and freight demand. Type of freight, demand models, examples.

- 10. **Simulation of urban freight distribution**
  - Learning time: 2h
  - Theory classes: 2h
  - Description: Simulation of urban freight distribution
250ST2122 - Transport of Goods

11. Pricing and rating

| Description: |

Learning time: 2h
- Theory classes: 2h

Qualification 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:


Others 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.