250ST022 - Demand of Transportation Systems

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 SUPPLY CHAIN, TRANSPORT AND MOBILITY MANAGEMENT (Syllabus 2014). (Teaching unit Compulsory)
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: English

Teaching staff
Coordinator: Lidia Montero Mercadé
Others: FRANCESC ROBSTÉ ANTÓN

Prior skills
Students must have sufficient knowledge of algebra and mathematical analysis in order to assimilate concepts regarding probability, univariant distribution of random variates, numerical series, matrix algebra, functions of real variables in one or more dimensions, derivation and integration.
Student must have basic programming skills in pseudocode or in a high level programming language.
A basic R language knowledge is highly recommended

Teaching methodology
Classes, Exercises, Course Reports and Exams
Material: Powerpoints, course notes and readings

Learning objectives of the subject
Demand, customer, discrete choice, utility, logit, probit, likelihood, entropy, Wardrop, satisfaction, elasticity, surveys, revealed references, stated preferences, Weibull, modal split, assignment, user equilibrium, system equilibrium, McFadden, Daganzo, Spiess, gravity model, calibration.

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>
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<tr>
<td></td>
<td>Self study: 80h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
### 1. Introduction to UTP modeling.

**Learning time:** 4h  
Practical classes: 2h  
Laboratory classes: 1h  
Self study: 1h  

**Description:**  
Introduction

### 2. Data and Space

**Learning time:** 12h  
Practical classes: 4h  
Laboratory classes: 2h  
Self study: 6h

**Description:**  
Data and Space

### 3. Trip generation

**Learning time:** 8h  
Practical classes: 2h  
Laboratory classes: 1h  
Self study: 5h

**Description:**  
Trip generation modeling

### 4. Trip Distribution

**Learning time:** 11h  
Practical classes: 4h  
Laboratory classes: 2h  
Self study: 5h

**Description:**  
Trip distribution modeling
## 5. Modal split and discrete choice models

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 32h</th>
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<tbody>
<tr>
<td>Modal split and discrete choice models</td>
<td>Practical classes: 8h</td>
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<tr>
<td></td>
<td>Laboratory classes: 4h</td>
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<tr>
<td></td>
<td>Self study : 20h</td>
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## 6. Assignment

<table>
<thead>
<tr>
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<th>Learning time: 8h</th>
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</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 1h</td>
</tr>
<tr>
<td></td>
<td>Self study : 5h</td>
</tr>
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</table>

## 7. Behavioural Economics

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 8h</th>
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<tbody>
<tr>
<td>Behavioural Economics</td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 1h</td>
</tr>
<tr>
<td></td>
<td>Self study : 5h</td>
</tr>
</tbody>
</table>

## 8. Traffic and Revenue Forecasting

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 8h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic and Revenue Forecasting</td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 1h</td>
</tr>
<tr>
<td></td>
<td>Self study : 5h</td>
</tr>
</tbody>
</table>
Partial exam (F1, 1/3) and global exam (F2, 2/3).
P Mark: Exercises/Reports. E Mark = Max(F2,(F1+2F2)/3).
Final Mark = (P + E)/2.
COVID-19 health crisis during Semester 2 of the 2019-20 Academic Year does not affect the Qualification System of this subject.

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**Exams**

**Description:**
The Quiz or Partial Exam takes place in the mid-semester week, which is programmed by ETSEIB. The date depends on ETSEIB and it is not set by teachers or students. The Final Exam evaluates contents of the whole subject and it is programmed by ETSEIB at the end of the Term.

Partial exam (F1, 1/3) and global exam (F2, 2/3).
P Mark: Exercises/Reports. E Mark = Max(F2,(F1+2F2)/3).
Final Mark = (P + E)/2.

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**Course Reports**

**Description:**
Course reports: Exercises and Laboratory Practices to be posted on ATENEA Tasks

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**Learning time:**
16h
- **Practical classes:** 4h
- **Self study:** 12h

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**Qualification system**

Partial exam (F1, 1/3) and global exam (F2, 2/3).
P Mark: Exercises/Reports. E Mark = Max(F2,(F1+2F2)/3).
Final Mark = (P + E)/2.
COVID-19 health crisis during Semester 2 of the 2019-20 Academic Year does not affect the Qualification System of this subject.

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**Regulations for carrying out activities**

Formula cribsheet, statistical tables and calculator are allowed
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Bibliography

Basic:


