Course guide
220325 - 220325 - Air Transport

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 732 - OE - Department of Management.

Degree: MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2022  ECTS Credits: 5.0  Languages: English

LECTURER

Coordinating lecturer: Lordan Gonzalez, Oriol

Others:

PRIOR SKILLS

Students must have a good knowledge of R and data.table package (taught in 220309 - Transport Aeri i Sistemes de Navegació).

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEEAEROP3. MUEA/MASE: The ability to apply analytical and business management techniques to aeronautical companies (specific competency for the specialisation in Airports).
CEEAEROP1. MUEA/MASE: The ability to analyse airport operations, planning and air transport (specific competency for the specialisation in Airports).

TEACHING METHODOLOGY

The course is divided into parts:

- Theory classes
- Practical classes
- Self-study for doing exercises and activities

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.

In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.
The teachers provide the syllabus and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

This course introduces the concepts, principles and fundamentals of optimization problems for analysis and decision-making of airline operations and scheduling such as fleet assignment, aircraft routing and crew scheduling. But first, students will learn to solve mixed integer linear problems and report with R Markdown.
**STUDY LOAD**

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>80.0</td>
<td>64.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30.0</td>
<td>24.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15.0</td>
<td>12.00</td>
</tr>
</tbody>
</table>

Total learning time: 125 h

**CONTENTS**

**Module 1: Introduction**

**Description:**
- Mixed integer linear programming
- Reporting with R Markdown
- Flight scheduling

**Related activities:**
Assignment 1

**Full-or-part-time:** 41h 40m
- Theory classes: 10h
- Laboratory classes: 5h
- Self study: 26h 40m

**Module 2: Fleet assignment**

**Description:**
- Introduction
- Fleet assignment problem
- Fleet assignment linear model

**Related activities:**
Assignment 2

**Full-or-part-time:** 31h 15m
- Theory classes: 7h 30m
- Laboratory classes: 3h 45m
- Self study: 20h

**Module 3: Aircraft Routing**

**Description:**
- Introduction
- Aircraft routing problem
- Aircraft routing linear model

**Related activities:**
Assignment 3

**Full-or-part-time:** 31h 15m
- Theory classes: 7h 30m
- Laboratory classes: 3h 45m
- Self study: 20h
Module 4: Crew scheduling

Description:
- Introduction
- Crew pairing problem
- Crew pairing linear model
- Crew rostering problem
- Crew rostering linear model

Related activities:
Assignment 4
Assignment 5

Full-or-part-time: 20h 50m
Theory classes: 5h
Laboratory classes: 2h 30m
Self study: 13h 20m

GRADING SYSTEM

The final grade depends on the following assessment criteria:

Assignment 1: 15% (10% result + 5% report)
Assignment 2: 25% (15% result + 10% report)
Assignment 3: 30% (20% result + 10% report)
Assignment 4: 15% (10% result + 5% report)
Assignment 5: 15% (10% result + 5% report)

As there are no written tests, there won't be any exam to retake.

BIBLIOGRAPHY

Basic:

Complementary: