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220325 - Air Transport

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering

Teaching unit: 732 - OE - Department of Management

Academic year: 2018

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

ECTS credits: 5 Teaching languages: English

Teaching staff

Coordinator: Oriol Lordan

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).
CEEAEROP2. MUEA/MASE: The ability to design and calculate airport installations (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

The course Air Transport introduces students to the concepts, principles and fundamentals of optimization problems for analysis and decision-making of airline operations and scheduling such as fleet assignment, aircraft routing, crew scheduling and manpower planning.

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Study load

Total learning time: 125h	Hours large group:	30h	24.00%
	Hours small group:	15h	12.00%
	Self study:	80h	64.00%

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Content

Module 1: Introduction

Learning time: 13h 20m

Theory classes: 3h 20m
Laboratory classes: 1h 40m
Self study : 8h 20m

Description:
- Graph theory and integer linear models
  - Graph basics
  - Graph topology
  - Basic graph problems used in air transport
  - Basic ILP used in air transport

- Flight scheduling

Module 2: Fleet assignment

Learning time: 27h 55m

Theory classes: 6h 40m
Laboratory classes: 3h 20m
Self study : 17h 55m

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

Related activities:
Activity 1
Project, part 1

Module 3: Aircraft Routing

Learning time: 27h 55m

Theory classes: 6h 40m
Laboratory classes: 3h 20m
Self study : 17h 55m

Description:
- Introduction
- Aircraft Routing problem
- Aricraft Routing linear model

Related activities:
Activity 2
Project, part 1

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Module 4: Crew Scheduling	Learning time: 27h 55m Theory classes: 6h 40m Laboratory classes: 3h 20m Self study : 17h 55m

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

Related activities:
Activity 3
Project, part 2

Module 5: Manpower planning	Learning time: 27h 55m Theory classes: 6h 40m Laboratory classes: 3h 20m Self study : 17h 55m

Description:
- Introduction
- Manpower Planning problem
- Manpower Planning linear model

Related activities:
Activity 4
Project, part 2

Qualification system

The final grade depends on the following assessment criteria:
Activities 1-4: Activities in class, weight: 60% (15% each)
Project, parts 1-2: Project in groups, weight: 40% (20% each)

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.
If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

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Bibliography

Basic:

Barnhart, C.; Smith, B.C. Quantitative problem solving methods in the airline industry: a modeling methodology handbook. New York [etc.]: Springer, cop. 2012. ISBN 9781461416074.

Yu, Gang. Operations research in the airline industry. Boston: Kluwer Academic Publishers, 1998. ISBN 9781461375135.

Bazargan, Massoud. Airline operations and scheduling [on line]. Burlington, VT: Ashgate, 2010 [Consultation: 17/11/2016]. Available on: <http://site.ebrary.com/lib/upcatalunya/docDetail.action?docID=10400548&p00=airline%20operations%20scheduling>. ISBN 9780754679004.

Complementary:

Pindado Carrión, S. Elementos de transporte aéreo. Madrid: Escuela Técnica Superior de Ingenieros Náuticos, DL 2006. ISBN 9788492111398.

Sallán, J.M. [et al.]. Métodos cuantitativos de organización industrial I [on line]. 2ª ed. Barcelona: Edicions UPC, 2005 [Consultation: 17/11/2016]. Available on: <http://hdl.handle.net/2099.3/36256>. ISBN 8483017954.

Fonollosa, Joan B. [et al.]. Métodos cuantitativos de organización industrial II [on line]. [2ª ed.]. Barcelona: Edicions UPC, 2005 [Consultation: 17/11/2016]. Available on: <http://hdl.handle.net/2099.3/36257>. ISBN 8483017946.