# Air transport

**Academic Year: ( 2023 / 2024 )** **Review date: 11-07-2023**

**Department assigned to the subject: Aerospace Engineering Department**

**Coordinating teacher: CEREZO MAGAÑA, MARIA**

**Type: Compulsory ECTS Credits : 3.0**

**Year : 2 Semester : 1**

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Air Navigation Systems
Airports

## OBJECTIVES

The course is dedicated to the study of airline economics, focusing on the most relevant economic analyses (profits vs. costs) and the different strategies to be implemented to optimize the results of the different demands, i.e. the correct allocation of the fleet to cover the different destinations as well as the path to minimize fuel consumption.

By successfully completing this course, the student should be able to:

1) Understand the social, economical and legal framework that applies to air transport.
2) Understand the roles of different actors, in particular airlines and manufacturers.
3) Understand airlines' operations, including aircraft operational performances
4) Understand how optimization algorithms can be applied to improve airlines' operations

## DESCRIPTION OF CONTENTS: PROGRAMME

Block I: Social, economical and legal framework

Defintion
Air transport Legislation (national and supranational organisms)
Air transport demand and markets
Certification Issues
Environmental impact
Maintenance
Aviation safety and security

Block II: Manufacturers and Airlines

Aircraft types and characteristics
The main aircraft manufacturers
Aircraft manufacturing cost
The Airlines
Airlines operational cost

Block III: Airline flight Operations

- Airline fleet planning
- Airline Schedule development
- Route planning
- Aircraft operational perfomances

Block IV: Optimization in air transport

- Airline schedule optimization: fleet assignment, schedule design, crew, maintenance.
- Flight plan optimization: optimal control and trajectory optimization

## LEARNING ACTIVITIES AND METHODOLOGY

TEACHING ACTIVITES

AF1 - Theoretical sessions

AF2 - Practical sessions (exercises)

AF3 - Labs in computer room

AF5 - Individual work by the student

AF7 - Group work

TEACHING METHODOLOGY

MD1 - Class exposition with the aid of computers and audiovisuals, and on the blackboard. Development of concepts and analysis of the bibliographic material

MD2 - Critical lecture of different material: technical reports, papers, manuals.

MD3 - Resolution of exercises posed by the Professor.

MD4 - Presentation and discussion in class, under teacher moderation issues related to the content of the material and case studies based on real projects.

MD5 - Elaboration of reports and oral communications by the student

## ASSESSMENT SYSTEM

Continuous Evaluation: 40%

a) Labs (report)
b) Individual and/or group Homework

Exam: 60%

Minimun final exam mark is 4 (out of 10) in order to go for the continuous evaluation.

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| **% end-of-term-examination:** | 60 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 40 |

## BASIC BIBLIOGRAPHY

- Peter Belobaba, Amadeo Odoni and Cynthia Barnhart The Global Airline Industry, Wiley, 2009

## ADDITIONAL BIBLIOGRAPHY

- Dr George Williams,Dr J Frankie O'Connell Air Transport in the 21st Century: Key Strategic Developments, ashgate, 2011
- John G. Wensveen Air Transportation: A Management Perspective, Ashgate, 2015 (8th edition)
- Doganis Flying Off Course: The Economics of International Airlines, Routledge, 2013
- Dr Thomas Tacker,Mr Ken Fleming,Dr Bijan Vasigh Introduction to Air Transport Economics: From Theory to Applications, Ashgate, 2013
- Luis Utrilla Descubrir el transporte aéreo - 2ª Edición, AENA, 2003
- The Airline Business Rigas Doganis, Routledge, 2005