

Course guide

300087 - SMAO - Strategic Management for Airline Operations

Last modified: 06/06/2024

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 748 - FIS - Department of Physics.

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

Academic year: 2024 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Jovana Kuljanin

Others:

PRIOR SKILLS

English (and professional/technical english). Mathematics and statistics. Knowledge related to business course (business models, microeconomics, macroeconomics, international agreements and organizations in civil aviation, air transport industry). Knowledge related to aircraft, airport and airspace acquired in other courses of Bachelor degree. Basic and required courses related to calculus and statistics. Business/company, aerospace technology, air transport infrastructure. Familiarity with knowledge of programming languages is preferable, especially Python and/or Matlab and C++.

REQUIREMENTS

Concepts seen in 220309 - Transport Aeri i Sistemes de Navegació
(https://www.upc.edu/estudispdf/guia_docent.php?codi=220309&idioma=en)

TEACHING METHODOLOGY

Specific competences:

CEEaeronav3: Estructurar organizativamente una aerolínea, incluyendo su modelo de negocio y la estructura de costes y beneficios, y modelar, analizar y diseñar las operaciones de una flota de aeronaves.

The course combines the following teaching methodologies:

- Theory classes.
- Autonomous learning: students will study using self-learning material.
- Cooperative learning: students will form small group (2-4 people) to fulfill some of the activities of the course.
- Project based learning: students will build a small team project (3-4 people).

Directed learning hours will consist in exercises and practical examples, after the theory classes in which the professor exposes the content of the subject. With the directed learning hours, the students will be motivated to participate actively in their education and to complete the knowledge acquired during theory classes, usually with the help of computers.

LEARNING OBJECTIVES OF THE SUBJECT

The aim of this course is to provide students with the fundamentals of the strategic management of the airline operations. Some strategic management concepts and analytical tools to the airline industry will be proposed, as well as modeling and optimization techniques.

On successful completion of this course a student will be able to:

- . appraise key factors affecting demand for air travel,
- . evaluate forecasting methods and interpret the results with confidence,
- . understand the structure of airline revenue and cost,
- . understand the principles of airline network design,
- . describe the functions of flight operations, crewing and scheduling departments and the legal requirements,
- . develop a flight and crew schedule,
- . understand the impact of irregular operations and mechanisms to efficiently handle the disruption,
- . state how maintenance requirements are determined and how the legal requirements are met.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	22.39
Self study	80,0	59.70
Hours medium group	9,0	6.72
Hours small group	15,0	11.19

Total learning time: 134 h

CONTENTS

Introduction to demand and forecasting for airlines

Description:

- Introduction to air travel demand concept
- Introduction to air travel demand forecasting
- Market analysis, trend analysis, time series analysis
- Econometric modelling
- Evaluating forecasting results

Full-or-part-time: 9h

Theory classes: 4h

Laboratory classes: 2h

Self study : 3h

Airline planning and operations

Description:

- Airline network design
- Fleet and schedule planning
- Aircraft routing and airline crew pairing and rostering

Full-or-part-time: 31h

Theory classes: 8h

Practical classes: 3h

Self study : 20h



Disruption management

Description:

- Irregular operations and disruption management
- Basic concepts on airline maintenance

Full-or-part-time: 16h

Theory classes: 6h

Laboratory classes: 2h

Self study : 8h

Project

Description:

Working in groups, the students will perform a literature review to select current challenges in airline planning and operations (i.e., crew pairing and rostering, fleet planning, etc.,) and will develop an algorithm to propose a solution to the identified problem. Focus will be made on identifying the problem, extracting realistic data, choosing the best method to solve it, validating the model and correctly extracting results, statistics and conclusions.

Full-or-part-time: 69h

Theory classes: 8h

Laboratory classes: 12h

Self study : 49h

GRADING SYSTEM

Participation in class and exercises: 10%

Individual exams and tests: 35%

Projects and presentations: 55%

BIBLIOGRAPHY

Basic:

- Doganis, Rigas. Flying off course : airline economics and marketing. 4th ed. London ; New York: Routledge, cop. 2010. ISBN 9780415447379.
- Holloway, Stephen. Straight and level : practical airline economics [on line]. Third edition. London: Routledge, 2016 [Consultation: 26/07/2022]. Available on : <https://www-taylorfrancis-com.recursos.biblioteca.upc.edu/books/mono/10.4324/9781315610894/straight-level-stephen-holloway>. ISBN 9786611798703.
- Bruce, Peter J; Gao, Yi; King, John M. C. Airline operations : a practical guide. New York: Routledge, 2018. ISBN 9780367669850.
- Shaw, Stephen. Airline marketing and management. 7th ed. Farnham, Surrey ; Burlington, VT: Ashgate, cop. 2011. ISBN 9781409401476.
- Clark, Paul. Buying the big jets : fleet planning for airlines [on line]. Third edition. New York: Earthscan, 2017 [Consultation: 22/01/2025]. Available on : <https://www-taylorfrancis-com.recursos.biblioteca.upc.edu/books/mono/10.4324/9781315195780/buying-big-jets-paul-clark>. ISBN 9781138749825.