

Course guide

300420 - ATM-OA - Single European Sky ATM Research

Last modified: 06/06/2024

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 701 - DAC - Department of Computer Architecture.

Degree: BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING (Syllabus 2015). (Optional subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: Definit a la infoweb de l'assignatura.

Others: Definit a la infoweb de l'assignatura.

PRIOR SKILLS

English

REQUIREMENTS

Informatica2, Aeronautic Communications, Aerial Operations

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. CE 9 AERO. Comprender la globalidad del sistema de navegación aérea y la complejidad del tráfico aéreo. (CIN/308/2009, BOE 18.2.2009)

Transversal:

2. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

TEACHING METHODOLOGY

Exposition classes and activities

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student should be able to:

- Explain the meaning of 4D trajectories, network operations, SWIM, CDM and traffic synchronization.
- Identify novelties and contributions in research articles on ATM.
- Use/develop evaluation tools to measure the efficiency of the air space
- Determine, from SESAR official documents, the advantages and inconvenients of the different research contributions.
- Sintetize in a research paper some novel ideas on air traffic management, apply methods to test the ideas and present the results

STUDY LOAD

Type	Hours	Percentage
Guided activities	14,0	9.33
Hours large group	26,0	17.33
Hours small group	26,0	17.33
Self study	84,0	56.00

Total learning time: 150 h

CONTENTS

(ENG) Introduction to research

Description:

Process of creation of new knowledge. Ethics of research

Related activities:

T0, T1

Full-or-part-time: 9h

Theory classes: 1h

Laboratory classes: 2h

Guided activities: 1h

Self study : 5h

(ENG) Organization of SESAR JU

Description:

(ENG) Institutions involved in the Joint Undertaking. Budgeted. Projects. Stakeholders

Related activities:

T0, T1, T2

Full-or-part-time: 2h 30m

Theory classes: 1h

Self study : 1h 30m

(ENG) Current and future air traffic

Description:

(ENG) Definition phase outcomes. Current situation. Performance objectives. ConOps.

Related activities:

T0, T1, T2, A1, A2

Full-or-part-time: 24h 30m

Theory classes: 4h

Laboratory classes: 4h

Guided activities: 2h

Self study : 14h 30m

(ENG) Complexity theory

Description:

(ENG) Emerging behaviours. Complexity models. Simulation.

Related activities:

T0, A2, A5

Full-or-part-time: 13h 30m

Theory classes: 2h

Laboratory classes: 2h

Guided activities: 1h

Self study : 8h 30m

(ENG) Functional Airspace Blocks

Description:

(ENG) Dynamic sectorization

Related activities:

T0, T1, T2, A1

Full-or-part-time: 27h 30m

Theory classes: 4h

Laboratory classes: 6h

Guided activities: 3h

Self study : 14h 30m

(ENG) Business Trajectory Management

Description:

(ENG) Sharing of trajectories. Trajectory negotiation. Business/mission trajectories. Precision of trajectories. Planning of aerial operations

Related activities:

T0, T1, T2, A2, A4

Full-or-part-time: 19h 30m

Theory classes: 1h

Laboratory classes: 4h

Guided activities: 2h

Self study : 12h 30m

(ENG) Flight synchronization

Description:

(ENG) Contracts for trajectory execution. Controlled Time of Arrivals/Over. Multiples TCA/TCOs

Related activities:

T0, T1, T2, A5

Full-or-part-time: 21h 30m

Theory classes: 3h

Laboratory classes: 4h

Guided activities: 2h

Self study : 12h 30m



(ENG) Ground flight information systems

Description:

(ENG) Aeronautic datalinks: air/air, air/ground, ground/ground. Information systems. Tools for collaborative decision.

Related activities:

T0, T1, T2, A4

Full-or-part-time: 8h 30m

Theory classes: 6h

Self study : 2h 30m

(ENG) Conflict Automation

Description:

(ENG) Prediction of separation conflicts. Resolution advisory. Tools for automation and human decision support.

Related activities:

T0, T1, T2, A5, A6

Full-or-part-time: 22h 30m

Theory classes: 4h

Laboratory classes: 4h

Guided activities: 2h

Self study : 12h 30m

ACTIVITIES

TO

Description:

Attend to lectures

Specific objectives:

Theory

Material:

Slides

Delivery:

none

Full-or-part-time: 26h

Theory classes: 26h



T1

Description:

Students task developed from theory classes

Specific objectives:

Practic knowledge

Material:

Atenea

Delivery:

T1 (25%)

Full-or-part-time: 30h

Self study: 30h

T2

Description:

Exam: individual control, respond to questions from the syllabus

Specific objectives:

Data processing

Material:

Atenea

Delivery:

T2 (20%)

Full-or-part-time: 10h

Self study: 10h

A1

Description:

Flight data analysis

Specific objectives:

Data processing and validation

Material:

Same as A2

Delivery:

A1(10%)

Full-or-part-time: 15h

Self study: 6h

Guided activities: 3h

Laboratory classes: 6h

A2

Description:

Activity of predicting data using machine learning

Specific objectives:

Learning of processing tool

Material:

Python

Delivery:

A2 (10%)

Full-or-part-time: 15h

Self study: 6h

Guided activities: 3h

Laboratory classes: 6h

A3

Description:

Activity to calculate noise and emissions of flights

Specific objectives:

Practics and Theoretical knowledge. CE9

Material:

IMPACT

Delivery:

A3 (10%)

Full-or-part-time: 15h

Self study: 6h

Guided activities: 3h

Laboratory classes: 6h

A4

Description:

Activity to calculate and show the potential aircraft conflicts

Material:

Atenea

Delivery:

A4 (10%)

Full-or-part-time: 15h

Self study: 6h

Guided activities: 3h

Laboratory classes: 6h



A5

Description:

Flight safety resolution

Material:

Bibliography

Delivery:

A5 (15%)

Full-or-part-time: 24h

Self study: 15h

Guided activities: 3h

Laboratory classes: 6h

GRADING SYSTEM

weighted mean within activities

EXAMINATION RULES.

Individual

BIBLIOGRAPHY

Basic:

- ICAO. Global air traffic management operational concept. Montreal: ED. International Civil Aviation Organization, 2005. ISBN 9789291945542.

RESOURCES

Other resources:

IMPACT