Course guides
300420 - ATM-OA - Sesar: Single European Sky ATM Research

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

Degree: BACHELOR’S DEGREE IN AIR NAVIGATION ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR’S DEGREE IN AIRPORT ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR’S DEGREE IN AEROSPACE SYSTEMS ENGINEERING (Syllabus 2015). (Optional subject).

Academic year: 2021  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 Comunications, 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 od 4D trajectories, network operations, SWIM, CDM and traffic sincronization.
- 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, aply methods to test the ideas and present the results
## STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>26,0</td>
<td>17.33</td>
</tr>
<tr>
<td>Guided activities</td>
<td>14,0</td>
<td>9.33</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>26,0</td>
<td>17.33</td>
</tr>
</tbody>
</table>

**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. Budged. 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:**

**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:

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:

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:

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
Laboratory classes: 6h
Guided activities: 3h
Self study: 6h
<table>
<thead>
<tr>
<th></th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Activity of predicting data using machine learning</td>
<td>Activity to calculate noise and emissions of flights</td>
<td>Activity to calculate and show the potential aircraft conflicts</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td>Learning of processing tool</td>
<td>Practics and Theoretical knowledge. CE9</td>
<td></td>
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<tr>
<td><strong>Material:</strong></td>
<td>Python</td>
<td>IMPACT</td>
<td>Atenea</td>
</tr>
<tr>
<td><strong>Delivery:</strong></td>
<td>A2 (10%)</td>
<td>A3 (10%)</td>
<td>A4 (10%)</td>
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<tr>
<td><strong>Full-or-part-time:</strong></td>
<td>15h</td>
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<td>Laboratory classes:</td>
<td>6h</td>
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<tr>
<td>Guided activities:</td>
<td>3h</td>
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</tr>
<tr>
<td>Self study:</td>
<td>6h</td>
<td>6h</td>
<td>6h</td>
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A5

Description:
Flight safety resolution

Material:
Bibliography

Delivery:
A5 (15%)

Full-or-part-time: 24h
Laboratory classes: 6h
Guided activities: 3h
Self study: 15h

GRADING SYSTEM

weighted mean within activities

EXAMINATION RULES.

Individual

BIBLIOGRAPHY

Basic:

RESOURCES

Other resources:
IMPACT