

## Course guide

### 205255 - SV - Flight Simulation for Aeronautical Engineering

Last modified: 05/07/2023

**Unit in charge:** Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
**Teaching unit:** 748 - FIS - Department of Physics.

**Degree:** BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).  
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Optional subject).

**Academic year:** 2023 **ECTS Credits:** 3.0 **Languages:** English

#### LECTURER

**Coordinating lecturer:** Enrique José García Melendo

**Others:** Oriol Català Ginebreda

#### PRIOR SKILLS

It is advisable to have taken the courses 220013 Vehicles Aeroespaciales and 220008 Espai Aèri, Navegació i Infraestructures

#### TEACHING METHODOLOGY

In the content exposition sessions, the professor will introduce the theoretical bases of the subject, concepts, methods and results, illustrating them with convenient examples to facilitate their understanding, complementing the teaching with practices in a simulator on a PC .

The students, autonomously, must work on the material provided by the professor and the results from the work sessions in order to assimilate and fix concepts.

#### LEARNING OBJECTIVES OF THE SUBJECT

To understand how aeronautics works on a daily basis once aircraft, airspace and procedures have passed the design stage and are certified for operation.

To learn the air communication procedures, VFR traffic and IFR traffic and the documents that regulate them.

Students must acquire knowledge about the different types of navigation in different airspaces and know how to find the requirements applicable to the regulations.

Understand the basics of VFR and IFR aeronautical communications.

Understand the basics of navigation and VFR procedures

Understand the basics of navigation and IFR procedures

Construction of traditional IFR and PBN procedures

Understand the interaction of aircraft with the different airspaces, with other aircraft and ATC control.

Basic Regulation

#### STUDY LOAD

| Type              | Hours | Percentage |
|-------------------|-------|------------|
| Self study        | 45,0  | 60.00      |
| Hours large group | 30,0  | 40.00      |

**Total learning time:** 75 h

## CONTENTS

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### 1. Introduction to air communications

**Description:**

- 1.1 Definitions
- 1.2 Phraseology
- 1.3 Communication procedures

**Related activities:**

Theoretical lessons and communications practice.

**Full-or-part-time:** 12h 30m

Theory classes: 5h

Self study : 7h 30m

### 3. Fundamentals of airplane flight

**Description:**

- 2.1 Definitions
- 2.2 Controls and flight mechanics
- 2.3 Instruments
- 2.4 Basic procedures

**Related activities:**

Theoretical lectures and practice by using Flight Simulator

**Full-or-part-time:** 12h 30m

Theory classes: 5h

Self study : 7h 30m

### 3. Introduction to visual flight

**Description:**

- 3.1 Definitions and regulations
- 3.2 Visual airspace
- 3.3 Visual navigation and ATC procedures
- 3.4 The visual traffic circuit
- 3.5 Visual cartography

**Related activities:**

Theoretical lectures and practice by using Flight Simulator

**Full-or-part-time:** 12h 30m

Theory classes: 5h

Self study : 7h 30m

#### 4. Introduction to instrumental flight

**Description:**

- 4.1 Definitions and regulations
- 4.2 Instrument airspaces
- 4.3 Instrument navigation and ATC procedures
- 4.4 Instrument flight phases: standard departures, standard arrivals, types of approaches and cruise
- 4.5 Instrumental cartography

**Related activities:**

Theoretical lectures and practice by using Flight Simulator

**Full-or-part-time:** 12h 30m

Theory classes: 5h

Self study : 7h 30m

#### 5. Regulatory framework

**Description:**

- 5.1 EASA air navigation regulations
- 5.2 Application of the regulations to airlines, both in their structure and in their operations
- 5.3 Structure of an airline and company typologies

**Related activities:**

Theoretical lectures and examples from real air companies.

**Full-or-part-time:** 12h 30m

Theory classes: 5h

Self study : 7h 30m

#### 6. Building of IFR procedures

**Description:**

- 6.1 Study of Document 8168
- 6.2 Application of the regulations to airlines, both in their structure and in their operations
- 6.3 Structure of an airline and company types

**Related activities:**

Theoretical lessons and explanation of practical cases in real companies.

**Full-or-part-time:** 12h 30m

Theory classes: 5h

Self study : 7h 30m

## ACTIVITIES

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### Theory lectures

**Description:**

Lecture where the most important theoretical concepts are explained

**Specific objectives:**

To understand the most important basic concepts with the help of the professor.

**Material:**

Class notes at Atenea.

Bibliography.

**Full-or-part-time:** 55h

Theory classes: 10h

Self study: 45h

### Practice by using Flight Simulator

**Specific objectives:**

Understand the most important basic concepts of each module with practical activities using Flight Simulator.

**Material:**

Class notes at Atenea.

Bibliography.

**Full-or-part-time:** 16h

Theory classes: 16h

### Partial Exam

**Description:**

In this exam the student's knowledge on the material lectured in modules 1, 2, and 3 will be tested.

**Specific objectives:**

Understand the most important basic concepts of each module with the help of the professor.

**Material:**

Non-programmable calculator and writing material.

**Delivery:**

Written exam

**Full-or-part-time:** 2h

Theory classes: 2h



### Final Exam

**Description:**

In this exam the student's knowledge on the material lectured in modules 4, 5, and 6, will be tested.

**Specific objectives:**

Understand the most important basic concepts of each module with the help of the professor.

**Material:**

Non-programmable calculator and writing material.

**Delivery:**

Writing exam

**Full-or-part-time:** 2h

Theory classes: 2h

## GRADING SYSTEM

1. Partial exam (50%)
2. Final exam (50%)

The partial and final exams will be scheduled during school hours. All students who have obtained an unsatisfactory result, that is, those who want to improve their grade, may take the Reconduction Exam of the partial and final exams. The Reconduction Exam will take place on the day set by the Academic Calendar. The redirection exam may improve the grade for the subject but in no case may it reduce it.

## EXAMINATION RULES.

Partial exams will be done individually. In none of these examinations the student will be allowed to use programmable calculators, notes or books.

## BIBLIOGRAPHY

**Basic:**

- Stephen Walmsley. Principles of Flight for the Private Pilot. Independently published, 2021. ISBN 979-8492228835.
- Conforti, Facundo. Navegación IFR y comunicaciones. Mar del Plata: Biblioteca Aeronáutica, 2021. ISBN 9789874214270.
- Conforti, Facundo. Comunicaciones aeronáuticas. Mar del Plata: Biblioteca Aeronáutica, 2021. ISBN 9798468912980.
- Conforti, Facundo. Navegación aérea: VFR - IFR. Mar del Plata: Biblioteca Aeronáutica, 2020. ISBN 9798734087312.
- Abeyratne, Ruwantissa. Air navigation law [on line]. Berlin: Springer, 2012 [Consultation: 15/02/2023]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=972978>. ISBN 9783642258350.