



Course guide

220065 - IS - Introduction to Sailplanes

Last modified: 15/05/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering.

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

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

LECTURER

Coordinating lecturer: Rafael Weyler Pérez

Others: Rafael Weyler Pérez

REQUIREMENTS

IMPORTANT:

The course combines lectures and a practical activity. Lectures will take place within the first two-month period specified in the classroom timetables. The course's practical activity will be carried out over the weekends and will be arranged during the course. Even if the flight is not done, it will take place at an aerodrome, which means students must get there by car.

Students who wish to do a flight must pay an additional payment for the flights (fuel and sailplane rental). For guidance, the price will be around €150 per flight, but this quantity is subject to change. At the beginning of the course, the cost and number of flights will be determined.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

3. GrETA/GrEVA - An understanding of how aerodynamic forces determine flight dynamics and the role of the different variables involved in flight.

1. Adequate and applied knowledge in engineering: physical phenomena of flight, its qualities and control, aerodynamic and propulsive forces, performance, and stability. (Specific technology module: Aircraft)

4. GrETA/GrEVA - An understanding of the uniqueness of airports in terms of infrastructure, structures and operation

2. Adequate applied knowledge in: aerodynamics, mechanics, and thermodynamics, flight mechanics, aircraft engineering (fixed-wing and rotary-wing), and theory of structures. (Specific technology module: Aircraft)

TEACHING METHODOLOGY

The course is divided into two sections:

Theory classes

This will be done in the classrooms of ESEIAAT. In this section, the student will be introduced to some theoretical concepts that will help them understand gliders and serve as a preparation for the practical activity. The theory behind gliders will be explained from a practical perspective. The scope of the explanations will range from theoretical flight conditions to practical situations in which a pilot may be involved.

The grade "Activity 1" are assignments and oral discussion.

Practical activity

This will take place in an aerodrome. In this section, the student will get in touch with what they learned from the theory. They will be able to examine sailplanes in service and experience the activity at an aerodrome. Everyone will be offered the opportunity to do some flights, but no one will receive scores for that, which is an optional choice.

The grade "Activity 2" are:

- (Optional) Individual flights in sailplanes with an experienced pilot.
- (Compulsory) Visit to the aerodrome.

IMPORTANT: Students who wish to fly are required to pay an additional fee per flight to the flight club. The maximum number of flights and their associated costs will be established at the beginning of the course.

LEARNING OBJECTIVES OF THE SUBJECT

The purpose of this course is to introduce students to engineering applications from a user's perspective rather than from an engineer's one, who may lack such training. The focus will be placed on a highly technical and specialized flight discipline, such as gliding, whose main aspects are closely related to engineering. The critical role that engineer play in the specification of user skills or training for proper device use is often overlooked. There will be discussions about the needs of the pilots, how engineers should summarize technical ideas to the purpose of the designed device, how to communicate them effectively, or some topics where a more in-depth analysis is required. The design process needs to be aware of aircraft requirements, limitations and functionality, but also understanding of the user's needs are, however, essential for the development of a successful design.

All of these concepts will be given special attention in the course, which will be divided into theoretical lectures and practical sessions. The basic concepts and how the glider works will be explained in the first part. In order to enhance understanding of these concepts, practical activities are conducted. These sessions will include interaction with the sailplane itself and the possibility of flight experience.

STUDY LOAD

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

Total learning time: 75 h



CONTENTS

Module 1: Theoretical aspects

Description:

- Introduction to gliding
- Basic knowledge of sailplanes
- Principles of flight
- Meteorology
- Fight techniques
- Special issues

Related activities:

- Theoretical sessions
- Activity 1: Assignments

Full-or-part-time: 45h

Theory classes: 20h

Self study : 25h

Module 2: Applied activities

Description:

- Procedures
- Handle the sailplanes
- The flight on sailplanes

Related activities:

- Theoretical sessions
- Practical sessions
- Activity 2: Individual flights in sailplanes

Full-or-part-time: 30h

Theory classes: 10h

Self study : 20h

GRADING SYSTEM

The final grade depends on the following assessment criteria:

- Activity 1, weight: 50 %
- Activity 2, weight: 50 %

BIBLIOGRAPHY

Complementary:

- Pajno, Vittorio. Sailplane design: a guide for students and designers: from drafting to flight test. Roma: IBN, 2014. ISBN 9788875650926.
- Reichmann, Helmut. Cross-country soaring: a handbook for performance and competition soaring. Santa Mónica: Thomson, 1978.