

Course guide

220030 - SI - Systems and Instruments

Last modified: 19/04/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 220 - ETSEIAT - Terrassa School of Industrial and Aeronautical Engineering.

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

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan

LECTURER

Coordinating lecturer: - José Luis Romeral Martínez

Others: - José Luis Romeral Martínez
- Joan Montaña Puig

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CE24. Adequate and applied knowledge in engineering: aircraft systems and automatic flight control systems for aerospace vehicles. (Specific technology module: Aircraft).

CE21. Adequate and applied knowledge in engineering: fundamentals of sustainability, maintainability, and operability of aerospace vehicles. (Specific technology module: Aircraft)

TEACHING METHODOLOGY

The methodology combines three complementary activities:

1. The lectures presented by professors.
2. Practical exercises at the laboratory.
3. Additional exercises to develop by the student. PBL methodology will be used.

LEARNING OBJECTIVES OF THE SUBJECT

- To apply the knowledge that students have acquired on basic electricity and electronics on the plane's electrical systems and its equipments
- To enable the student to design and select of electrical and electronic circuits to aircraft
- To introduce the principles, operation and maintenance of electrical and electronic systems of the airplane.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	14,0	12.44
Hours large group	31,0	27.56
Self study	67,5	60.00

Total learning time: 112.5 h

CONTENTS

Module 1. Introducing the airplane electrical system

Description:

Full-or-part-time: 4h

Theory classes: 2h

Self study : 2h

Module 2. Electric generation in the aircraft

Description:

Full-or-part-time: 23h

Theory classes: 6h

Practical classes: 5h

Self study : 12h

Module 3. Others elements of the electrical system of the aircraft

Description:

Full-or-part-time: 9h

Theory classes: 2h

Practical classes: 1h

Self study : 6h

Module 4. Distribution of electric energy in the aircraft

Description:

Full-or-part-time: 9h

Theory classes: 2h

Practical classes: 1h

Self study : 6h

Module 5. Operation and control of the electrical system

Description:

Full-or-part-time: 4h

Theory classes: 1h

Self study : 3h

Module 6. Electric propulsion

Description:

Full-or-part-time: 7h

Theory classes: 2h

Self study : 5h

Module 7. Sensors and Instrumentation Systems

Description:

Full-or-part-time: 12h

Theory classes: 3h

Practical classes: 3h

Self study : 6h

Module 8. Systems data acquisition and A / D conversion

Description:

Full-or-part-time: 14h

Theory classes: 4h

Practical classes: 2h

Self study : 8h

Module 9 Digital computers. Central processing units and peripheral cards

Description:

Full-or-part-time: 13h

Theory classes: 3h

Practical classes: 2h

Self study : 8h

Module 10. Digital Communications. Modulations and physical interfaces

Description:

Full-or-part-time: 8h

Theory classes: 3h

Self study : 5h

Module 11. Onboard computers and flight instruments

Description:

Full-or-part-time: 9h 30m

Theory classes: 3h

Self study : 6h 30m

ACTIVITIES

THEORY LESSONS / ELECTRICITY

Full-or-part-time: 35h

Theory classes: 14h

Self study: 21h



THEORY LESSONS / ELECTRONIC

Full-or-part-time: 35h

Theory classes: 14h

Self study: 21h

ELECTRICAL PROBLEMS

Full-or-part-time: 9h

Practical classes: 5h

Self study: 4h

ELECTRONIC PROBLEMS

Full-or-part-time: 5h 30m

Practical classes: 2h 30m

Self study: 3h

ELECTRICITY PRACTICES

Full-or-part-time: 4h

Practical classes: 2h

Self study: 2h

ELECTRONIC PRACTICE

Full-or-part-time: 7h

Practical classes: 4h

Self study: 3h

TEST MODULE 1, ELECTRICITY

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

Theory classes: 1h 30m

Self study: 7h

TEST MODULE 2, ELECTRONIC

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

Theory classes: 1h 30m

Self study: 7h



GRADING SYSTEM

$N_f = 0,35 \text{ Theory Mark Part 1} + 0,15 \text{ Laboratory Mark Part 1} + 0,35 \text{ Theory Mark Part 2} + 0,15 \text{ Laboratory Mark Part 2}$

Nf : Final Mark

Part 1: Electricity block

Part 2: Electronics block

Averaged Part 1 Mark (Electricity, 0,35 Theory Mark Part 1+ 0,15 Laboratory Mark Part 1) can be improved in a final exam. Anyhow, for the calculation of the final mark the highest mark achieved by the student for this Part 1 will prevail.

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

BIBLIOGRAPHY

Complementary:

- Tooley, Michael H. Aircraft digital electronic and computer systems: principles, operation and maintenance. 2007. Burlington: Elsevier, 2007. ISBN 0750681381.
- Martínez Rueda, J. Sistemas eléctricos y electrónicos de las aeronaves. Madrid: Paraninfo, 2007. ISBN 9788428329286.

RESOURCES

Audiovisual material:

- Apunts de classe