Course guide
220323 - 220323 - Airport Building Systems

Last modified: 11/04/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 709 - DEE - Department of Electrical Engineering.

Degree: MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2025 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Núria Forcada, Jordi Roger Riba

Others: Guerrero Pérez, Adrián

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEEAEROP1. MUEA/MASE: The ability to analyse airport operations, planning and air transport (specific competency for the specialisation in Airports).
CEEAEROP2. MUEA/MASE: The ability to design and calculate airport installations (specific competency for the specialisation in Airports).
CEEAEROP3. MUEA/MASE: The ability to apply analytical and business management techniques to aeronautical companies (specific competency for the specialisation in Airports).

TEACHING METHODOLOGY

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.
In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.
Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.
Students will work in small groups to apply concepts to given examples, in selecting and analysing building systems.
The teachers provide the syllabus and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

The course aims to give the student the ability to design and project airport systems including the Heating, Ventilation and Air Conditioning (HVAC), the watersystem, the sanitation system and the electrical system This course also aims to give the student the ability to design and project intelligent and energy efficient buildings.

STUDY LOAD

Type	Hours	Percentage
Self study	80,0	64.00
Hours large group	30,0	24.00
Hours small group	15,0	12.00

Total learning time: 125 h

CONTENTS

Module 1: HVAC Systems

Description:
Thermal comfort, psychometrics, heat transfer, thermal resistance, infiltration and ventilation, climate, solar geometry, passive heating, active heating, passive cooling, air conditioning, air distribution and HVAC concepts.

Related activities:
Exam
Exercises (Part 1)

Full-or-part-time: 31h 15m
Theory classes: 7h 30m
Practical classes: 3h 45m
Self study : 20h

Module 2: Mechanical Systems

Description:
Plumbing Systems including (cold and hot water).
Renewable energies (solar).
Sewage systems (including rain water drainage and sewage).
Fire protection measures (hydrants, sprinklers, etc.).

Related activities:
Exam
Exercises (Part 1)

Full-or-part-time: 31h 15m
Theory classes: 7h 30m
Practical classes: 3h 45m
Self study : 20h

Module 3: Electric Distribution Systems

Description:
Requirements for electrical installations.
Electrical Cables.
Distribution-System Protection.
System Grounding.
Lighting Systems for Indoor Areas.
Sizing a Power Distribution System.

Related activities:
Exam
Exercises (Part 2)

Full-or-part-time: 31h 15m
Theory classes: 7h 30m
Practical classes: 3h 45m
Self study : 20h

Module 4: Electric Generation Systems

Description:
Generation of Electric Power.
Solar Electric Systems.
Power generator.
Stationary Batteries.
Uninterruptible Power Supply.
Power Transformers.

Related activities:
Exam
Exercises (Part 2)

Full-or-part-time: 31h 15m
Theory classes: 7h 30m
Practical classes: 3h 45m
Self study : 20h

GRADING SYSTEM

The final grade depends on:
- Exam 1 (HVAC, water and sewerage systems, fire protection systems): weight 25%
- Exam 2 (lighting and electricity): weight 25%
- Exercises (part 1) weight 25%
- Exercises (part 2) weight 25%

There will be a final Activity to repeat the assessment of the exam.

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

Basic:
- Arizmendi Barnes, L.J. Cálculo y normativa básica de las instalaciones en los edificios. 7ª ed. renov. Pamplona: EUNSA, 2005. ISBN 8431318163.
- Reglamento de instalaciones térmicas en los edificios RITE [on line]. 5ª ed. Madrid: Paraninfo, 2008 [Consultation: 13/12/2016]. Available on: http://www.minetad.gob.es/energia/desarrollo/EficienciaEnergetica/RITE/Reglamento/RDecreto-1027-2007-Consolidado-9092013.pdf. ISBN 9788428330206.
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- Sanjurjo, R. Sistemas eléctricos en aeropuertos. Madrid: Centro de Documentación y Publicaciones de AENA, 2004. ISBN 8495135914.
- Ministerio de Industria, Turismo y Comercio. Reglamento electrotécnico para baja tensión: RBT: Real Decreto 842/2002 de 2 de agosto de 2002: actualizado según Real Decreto 560/2010, de 7 de mayo. 4ª ed. Madrid: Paraninfo, 2010. ISBN 9788428380959.
- García, M.; Sanjurjo, R. Sistemas energéticos en aeropuertos. 2ª ed. Madrid: Fundación AENA, 2006. ISBN 8495567377.
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- Código técnico de la edificación. Documento básico HS: salubridad [on line]. Madrid: Ministerio de Fomento, 2015 [Consultation: 12/04/2022]. Available on: https://www.codigotecnico.org/pdf/Documentos/HS/DBHS.pdf.
- Electrical installation guide: acording to IEC international standards [on line]. Rueil Malmaison: Schneider Electric, 2018 [Consultation: 07/05/2019]. Available on: https://www.schneider-electric.com/en/download/document/EIGED306001EN/.

RESOURCES

Other resources:
Manual teòric-pràctic Schneider: Instal·lacions en Baixa Tensió. Schneider Electric España, S.A. 2000.
Línies de transport d?energia. Luis M. Checa. Ed. Marcombo, 1988.
Cables elèctrics aïllats. Manuel Llorente. Ed. Paraninfo. 1994.
Manual de Baixa Tensió. SIEMENS. Ed. Marcombo. 2000.
Proteccions en les instal·lacions elèctriques.. Paulino Montané. Ed. Marcombo. 1999