

Course guide

220128 - SEE - Energy Efficiency Systems

Last modified: 11/04/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Optional subject).
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 DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2025 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Joan Carles Fernández Vallés

Others:

TEACHING METHODOLOGY

The course is divided into parts:

Theory classes

Practical classes

Self-study for doing exercises and activities.

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.

The teachers provide the syllabus and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

To introduce the student into a new way to analyze different systems taking into consideration the energetic point of view. Public buildings, transport and industries examples will be analyzed in order to reach improvements in their energetic costs.



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: Energy Audits

Description:

1. Definitions
2. Basic Energy concepts
3. Units
4. Introduction to the bills comprehension
5. Energy audits (Steps, scope)

Full-or-part-time: 14h

Theory classes: 6h

Self study : 8h

Module 2: Building Energy Audit

Description:

1. Introduction
2. Building concepts
3. Lighting concepts
4. Heating and cooling
5. First exercise definition

Full-or-part-time: 14h

Theory classes: 6h

Self study : 8h

Module 3: Energetic improvements in Transport.

Description:

1. First exercise presentation
2. Introduction to the energetic consumption in the transport
3. Aeronautics energetic improvements
4. Railway energetic improvements
5. Automotive energetic improvements

Full-or-part-time: 14h

Theory classes: 6h

Self study : 8h



Module 4: Industrial energetic assessment

Description:

1. Introduction
2. Electrical energy management
3. Energetic improvements in the industry
4. Second exercise definition

Full-or-part-time: 14h

Theory classes: 6h

Self study : 8h

Module 5: Second exercise presentation

Description:

1. Presentations

Full-or-part-time: 19h

Theory classes: 6h

Self study : 13h

GRADING SYSTEM

The final grade will be calculated based on:

$$NT = 0,4 \times N1 + 0,5 N2 + 0,1 NC$$

Being:

NT: Final Grade

N1: First Exercise qualification

N2: Second Exercise qualification

NC: Contribution to the meetings

BIBLIOGRAPHY

Basic:

- Thumann, Albert; Younger, William J; Niehus, Terry. Handbook of energy audits. 8th ed. Lilburn GA : New York, NY: Fairmont Press ; Distribution by Marcel Dekker, cop. 2009. ISBN 9781439821459.

Complementary:

- Doty, Steve; Turner, Wayne C. Energy management handbook. 7th ed. Lilburn, GA : Boca Raton, FL: Fairmont Press ; Distributed by Taylor & Francis, cop. 2009. ISBN 9781420088700.

RESOURCES

Other resources:

Class notes