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|  | SUBJECT DESCRIPTION | MODELO PED.013.02 |
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| <i>Course</i> | Industrial Mechanics and Informatics | <i>Academic year</i> | 2021/2022 | | | |
| <i>Subject</i> | Renewable Energy and Energy Efficiency | ECTS | 5 | | | |
| <i>Type of course</i> | Compulsory | | | | | |
| <i>Year</i> | 3 rd | <i>Semester</i> | 2 nd | <i>Student Workload:</i> | | |
| <i>Professor(s)</i> | João António Lobão Andrade | | <i>Total</i> | 135 | <i>Contact</i> | 60 |
| <i>Area/Group Coordinator</i> | Rui António Pitarma S. Cunha Ferreira | | | | | |

Planned SD

1. LEARNING OBJECTIVES

- 1 - know the environmental implications associated with energy production and use. know renewable energy production technologies.
- 2 - Acquire knowledge inherent in the efficient management and rational use of energy, particularly in industry.
- 3 - Recognize the importance of this topic as fundamental to achieving energy savings and environmental enhancement factor.
- 4 - Develop a critical spirit, a taste for research and the student autonomy in the analysis of energy consumption and implementation of measures / plans for energy efficiency, according to the Portuguese Legislation.

2. PROGRAMME

Chapter 1 - Renewable Energy

Energetic situation; The situation in Portugal and in Europe; National Energy Strategy; Renewable energy sources; Social economic and environmental aspects; Promotion of the use of energy from renewable sources in industrial installations. Production technologies.

Chapter 2 - Energy Management and Energy Efficiency

Energy management and conservation; Rules and regulations; Analysis of investments in sustainable energy systems; Portuguese legislation (SGCIE; SCE;...); Identify and develop rationalization and energy efficiency measures; Energy audits and Consumption rationalization plans; Efficient use in buildings and industry; Energy consumption and cost reduction techniques (RO Rationalization Opportunities); RO analysis in buildings and industry; Implement rationalization and energy efficiency measures. Integration of renewable energy in rationalization measures and energy efficiency.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The themes in point 1 of the UC program allow students to achieve objectives (1) and (3).

The themes in point 2 of the UC program allow students to achieve objectives (2) and (4).

4. MAIN BIBLIOGRAPHY

Fernandes E. O., et al., (2009). Energias Renováveis, Atelier Nunes e Pã. ISBN: 9789899652903.

António M. F. da Silva J., (2012). Contributo para a Divulgação das Energias - Convencionais, Renováveis e Alternativas, PUBLINDUSTRIA. ISBN: 9789897230073.

Benjamim F Barros, Reinaldo Borelli, Ricardo L Gedra, (2015). Eficiência Energética - Técnicas de Aproveitamento, Gestão de Recursos e Fundamentos, ÉRICA. ISBN: 9788536514260.

APICER, Manual de Boas Práticas na Utilização Racional de Energia e Energias Renováveis, APICER.

ISQ, (2019). Manual de Auditorias Energéticas na Indústria, ADENE – Agência para a Energia. ISBN: 978-972-8646-74-5.

Sá, A. F., (2016). Guia de Aplicações de Gestão de Energia e Eficiência Energética (3ª edição). Publindustria. ISBN: 9789897231544.

Tietenberg, Tom, (2012). Environmental and Natural Resource Economics. Pearson. ISBN: 987-0-13-139257-1

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching methodologies:

- Lectures, with interactive context, debate and case studies. Use of various computer resources and practices and/or laboratory demonstrations. Supervision of practical work of students.

Evaluation methodologies:

- Continuous evaluation is based on two items with different percentages: written test (60%); practical research work (40%) with minimum grade of 9.5.

- Other evaluations: best grade between written test of exam evaluation alone and continuous evaluation.

Final grade equal to or higher than 10 values to obtain approval, with 20 being the highest grade possible.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The expository method is used to present the fundamental contents associated with all objectives. The methodology of practical work allows the student to apply, throughout the semester and in a practical mode, the contents covered. In this way we seek to motivate students for the active learning of theoretical and practical knowledge, by conducting case studies that validate their applicability in a professional context. The methodology thus seeks to encourage students to develop a demanding work, compatible with the requirements in labor market, according to the Portuguese Legislation.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

Professor: João António Lobão Andrade (Ph.D); jlobão@ipg.pt; office n.º 11

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