VNIVERSITAT DE VALÈNCIA

Course Guide
34948 Energy consultancy

COURSE DATA

Data Subject	
Code	34948
Name	Energy consultancy
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1404 - Degree in Industrial Electronic Engineering	School of Engineering	4	First term

Subject-matter

Degree	Subject-matter	Character
1404 - Degree in Industrial Electronic Engineering	21 - Optional subjects	Optional

Coordination

Name	Department
SUAREZ ALVAREZ, ISAAC	242 - Electronic Engineering

SUMMARY

The course Energy Services is part of electives' Degree on Industrial Electronics Engineering, whose overall objective is to teach the basic techniques for analyzing, planning and management of energy supply processes, both industrial and residential and commercial.

This is a four-month elective course that is taught in the fourth year of the Degree in Industrial Electronics Engineering during the first quarter. It consists of a total of 6 ECTS.

This course is intended for students to acquire training in the preparation of studies, auditing, planning and management of the supply-demand pairing energy in all types of processes, and know the basics of the laws and regulations that apply to this field.

The course has a mixed theoretical and experimental character, so that to the theoretical concepts are added those of a practical nature. For this purpose, various real projects are carried out to acquire knowledge and familiarization with different types of tools, procedures and methodologies used in this area.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

To successfully address this course, it is recommended that the student has the previous theoretical and practical background taught in Physics, Mathematics, Chemistry, and Environmental Instrumentation.

OUTCOMES

1404 - Degree in Industrial Electronic Engineering

- CO1 - More comprehensive skills than those acquired in compulsory subjects must be acquired in elective subjects.

LEARNING OUTCOMES

This subject provides the following learning outcomes:

• Capacity to audit and analyze energy consumptions and behaviors in the industrial, residential and commercial areas (CO1).

• Capacity to implement energetic demand management projects (CO1).

• Capacity to operate and maintain energetic plans (CO1).

• Knowing how to use tools for analysis, diagnosis, monitoring, and management of consumptions and energetic behaviors (CO1).

DESCRIPTION OF CONTENTS

1. INTRODUCTION TO ENERGY SERVICES

1.1. Definition, general characteristics.
1.2. Current environment and outlook.
1.3. Regulations.
1.4. Business models.
1.5. Examples and applications.

PRACTICE 1: Analysis of a cogeneration plant

2. INTRODUCTION TO RENEWABLE ENERGIES

2.1. Need and types of renewable energies
2.2. Solar thermal energy.
2.3. Photovoltaic solar energy.

3. ENERGY AUDIT

3.1. Introduction.
3.2. Plan of action and verification.
3.3. Monitoring and evaluation methodologies.
3.4. Energy evaluation tools.
3.5. Regulations.

PRACTICE 2: Measurements energy audit.

4. ENERGY EQUPMENTS

4.1. Introduction.
4.2. Lighting equipment.
4.3. Air conditioning equipment.
4.4. Other types of equipment.
4.5. Examples of application.

PRACTICE 3: Analysis of air conditioning.

5. ENERGY CERTIFICACION

5.1. Goals.
5.2. Regulations.
5.3. Certification procedures.
5.4. Application examples. Exercises.

PRACTICE 4: Energy certification of buildings with CE3x.
PRACTICE 5: Making an energetic certification with CERMA.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	40,00	100
Laboratory practices	20,00	100
Attendance at events and external activities	6,00	0
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	10,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	12,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	12,00	0
Resolution of case studies	10,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

The development of the course is structured around five axes: the theory and problems sessions, tutorials, submission of continuous assessment tests, workshops and finally laboratories (CO1).

In group learning with the teacher (sessions of theory and problems, CO1), the lecture model is used.

At problem sessions, the teacher will explain several type exercises, through which the student will learn to identify the essential elements of the approach and resolution procedure. Participatory approach allows the students to interact at such meetings and propose solutions.

The lab groups will be formed as maximum by two / three people. Practices should be organized to be prepared in advance of the lab session and resolved correctly in the established time.

During the course, within the concrete possibilities of each academic year, various seminars will be made to complement the explained contents (CO1). These seminars are intended as actual and market vision in the Energy Services area. These activities will be part of continuous assessment and are nonrecoverable.

Workshops will include the full resolution, in groups of 4 or 5 people, of a real project (CO1). Several projects will be raised and be assessed through the delivery of a detailed project documentation.

Students have a tutorial schedule whose purpose is to solve problems and doubts. Furthermore, questions can be answered via email or discussion forums of the Aula Virtual.

The student has the following documents in the Aula Virtual to achieve a successful completion of the described teaching methodology:

- Course Guide
- Transparencies of each topic
- Problem bulletin
- Laboratory handouts.
- Seminars
- Workshops

EVALUATION

The learning process will be evaluated by means of examinations, through the evaluation of laboratory sessions and the completion of assignments (assessment of CO1 competence). The completion of assignments is not recoverable, so all students are required to complete them if they wish to be evaluated. An average mark equal to or higher than 5/10 will be required to pass the course, provided that each of the parts is equal to or higher than 4/10. The final grade is obtained from the following considerations:

- The overall grade for the course, for students who regularly attend classes during the term, is given by the following expression:

Final mark = (Examination_theo x 0,40)+(Works x 0,30)+(Sessions_lab x 0,30)

- For students who cannot attend regularly the theoretical and laboratory classes, the note will be obtained from the evaluation of the work, the theory exam and lab exam (CO1) date stated in the official calendar the tests. In this case, the overall score is given by:

Final mark= (Examination _theo x 0,45)+(Works x 0,25)+(Examination_lab x 0,30)

The works are considered non-recoverable activities and mandatory for overcoming the subject. Your assessment will be included in the overall evaluation of the two calls.

In any case, the evaluation system will be governed by what is established in the Reglament de Avaluació i Qualificació de la Universitat de València per a Graus i Màsters

(http://www.uv.es/graus/normatives/2017_108_Reglament_avaluacio_qualificacio.pdf).

REFERENCES

Basic

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- Esquerra Pizà, P. Dispositivos y sistemas para el ahorro de energía Ed. Marcombo, 1988, ISBN: 84-267-0722-X
- Aranda, A., Zabalza, I., Díaz, S., Llera, E., Eficiencia energética en instalaciones y equipamiento de edificios Ed. Prensas Universitarias de Zaragoza, 2010, D.L.: Z-1295/2010
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- Ahedo, C.M., Becerra, J.L., El mercado de las energías renovables en España. Situación 2008, Fundación EOI, 2009, ISBN: 978-84-936547-4-0
- González Velasco, J., Energías Renovables, 1ª Edición, Editorial Reverté, S.A, 2009. ISBN: 978-84-291-9312-1 (ebook).
- Pareja Aparicio, M., Radiación solar y su aprovechamiento energético, Editorial Marcombo, 2010. ISBN: 978-84-267-1559-3 (ebook).
- Soteris Kalogirou - Solar energy engineering_ processes and systems-Elsevier_Academic Press (2009)
- Francis Vanek, Louis Albright - Energy Systems Engineering Evaluation and Implementation-McGraw-Hill Professional (2008)
- Chartered Institution of Building Services Engineers - Energy Efficiency in Buildings_ CIBSE Guide F-Chartered Institution of Building Services Engineers (2006)
- (The electrical engineering handbook series) Richard C. Dorf - The electrical engineering handbook. Systems, controls, embedded systems, energy, and machines _Third ed-CRC_Taylor & Francis (2006)
- Edward G. Pita - Air Conditioning Principles and Systems An Energy Approach-Prentice Hall (2001)
- F. Kreith, D. Goswami - Handbook of Energy Efficiency and Renewable Energy-Crc Press (2007)

Additional

- IDAE (http://www.idae.es)
- AVEN (http://www.aven.es)
- FENERCOM (http://www.fenercom.com)
- Agencia Andaluza de la Energía (http://www.agenciaandaluzadelaenergia.es)

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

Contents

The contents initially included in the teaching guide are maintained.

Volume of work and time planning of teaching

Regarding the workload:

The different activities described in the Teaching Guide are maintained with the planned dedication.

With respect to the time planning of teaching:

The material for monitoring the theory/practice classes in the classroom allows to maintain the initial time planning of teaching in both days and hours, whether the teaching is in the classroom or not.

Teaching methodology

In theory classes and classroom practices, the maximum possible attendance will be provided, always respecting the health restrictions that limit the capacity of the classrooms to 50% of their usual occupation. Depending on the capacity of the classroom and the number of students enrolled, it may be necessary to distribute students into two groups. If this situation arises, each group will attend the theory and classroom practice sessions with physical presence in the classroom on a rotational basis, thus ensuring compliance with space occupation criteria. The rotation system will be established once the real registration data are known, guaranteeing, in any case, that the percentage of attendance of all students registered in the subject is the same. For the theory sessions and classroom practices not presential will tend to a model of online teaching preferably synchronous, provided that it allows compatibility with other activities scheduled. On-line teaching will be carried out by means of synchronous videoconference, respecting the timetable, or, if this is not possible, asynchronous.

With respect to the laboratory practices, the attendance to the sessions programmed in the timetable will be totally presential.

Once the real registration data are available and the availability of spaces is known, the Academic Commission of the Degree will approve the Teaching Model of the Degree and its adaptation to each subject, establishing in this model the specific conditions in which the teaching of the subject will be developed.

If there is a closure of the facilities for health reasons that affects all or part of the classes of the subject, these classes will be replaced by non-attendance sessions following the established schedules.

Evaluation

The evaluation system described in the course's Teaching Guide is maintained, in which the different evaluable activities and their contribution to the course's final grade are specified.

If the facilities are closed for health reasons that affect the development of any assessable activity of the course, affected activities will be replaced by tests of a similar nature that will be carried out in virtual mode using the computer tools licensed by the University of Valencia. The contribution of each assessable activity to the final qualification of the course will remain unchanged, as established in this guide.

Bibliography

The bibliography recommended in the Teaching Guide is maintained as it is accessible and complemented by notes, slides and problems uploaded to the Virtual Classroom as subject material.