Course guide
330508 - F2 - Physics 2

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.
Degree: BACHELOR'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Compulsory subject).
Academic year: 2022  ECTS Credits: 4.5  Languages: Catalan

LECTURER

Coordinating lecturer: Ciriano Nogales, Yolanda
Others: Conangla Triviño, Laura
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Vallbe Mumbru, Marc
Vilanova Arnau, David
Rota Font, Francesc

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE2. Understanding and mastering the basic concepts of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application for solving engineering problems.

Generical:
CG3. Knowledge of basic and technological subjects that will enable students to learn new methods and theories and that will endow them with the versatility needed to adapt to new situations.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
2. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

Basic:
CB1. Students will be able to demonstrate their knowledge of a field of study that builds on secondary education and is usually found at a level that, while supported by advanced textbooks, also includes aspects that involve knowledge of the latest developments in the field of study.
CB2. Students will be able to apply their knowledge to their work or vocation in a professional manner and demonstrate that they possess the competencies that are typically demonstrated by elaborating and defending arguments and solving problems in the field of study.

TEACHING METHODOLOGY

MD1 Master class or lecture (EXP)
MD2 Problem solving and case study (RP)
MD3 Practical work in laboratory or workshop (TP)
MD7 Assessment activities (EV)
LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student should be able to do the following:
- Understand and use the basic principles of electric fields.
- Understand and use the basic principles of magnetic fields.
- Manipulate laboratory instruments, properly collect data, process data and prepare a report.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>22,5</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>22,5</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>67,5</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 112.5 h

CONTENTS

**Topic 1: ELECTRIC FIELDS**

**Description:**
Coulomb’s law, electric fields, electric potential. Applications of electrostatics. Capacitors, dielectrics. Electric current. DC circuits.

**Specific objectives:**
To understand and use the basic principles of electric fields.

**Related activities:**
Activity 1: Laboratory practical
Activity 1: Laboratory practical
Activity 2: Assessment test
Activity 3: Delivery
Activity 4: Final assessment test

**Full-or-part-time:** 52h 30m
Theory classes: 10h 30m
Laboratory classes: 10h 30m
Self study: 31h 30m

**Topic 2: MAGNETIC FIELDS**

**Description:**
Magnetic fields, magnetic field sources, magnetic materials, Faraday’s law of induction.

**Specific objectives:**
To understand and use the basic principles of magnetic fields.

**Related activities:**
Activity 1: Laboratory practical
Activity 2: Assessment test
Activity 3: Delivery
Activity 4: Final assessment test

**Full-or-part-time:** 60h
Theory classes: 12h
Laboratory classes: 12h
Self study: 36h
ACTIVITIES

Activity 1: LABORATORY PRACTICE

Description:
- Laboratory teamwork.
- The students read the instructions and produce a sheet to record the experimental data.

Specific objectives:
At the end of the activity, students should be able to do the following:
- Effectively handle the devices used in the activity.
- Understand the physical concepts involved in the activity.

Material:
- Web page: http://www.epsem.upc.edu/practiquesfisica
- All necessary equipment for carrying out the practical.

Delivery:
The team prepare and deliver a report to the professor, following the instructions.

Full-or-part-time: 4h 30m
Laboratory classes: 1h 30m
Self study: 3h

Activity 2: ASSESMENT TEST

Description:
Individual classroom on the theoretical concepts of the topics with exercises related to the learning objectives.

Specific objectives:
After the activity, students should be able to understand and use the basic principles of the topics.

Material:
Test paper and calculator.

Delivery:
Completed test.

Full-or-part-time: 7h 30m
Theory classes: 1h 30m
Self study: 6h

Activity 3: DELIVERY

Description:
Individual multiple choice test about theoretical concepts and/or problem solving related to the topics.

Specific objectives:
After the activity, students should be able to understand and use the basic principles of the topics.

Material:
Test paper and calculator.

Delivery:
Delivery of the completed test on time.

Full-or-part-time: 3h
Self study: 3h
Title of activity of class 4: FINAL ASSESSMENT TEST

Description:
Individual classroom test on the theoretical concepts of the subject with exercises related to the learning objectives.

Specific objectives:
After the activity, students should be able to understand and use the basic principles of the subject.

Material:
Test paper and calculator.

Delivery:
Completed test.

Full-or-part-time: 13h
Theory classes: 3h
Self study: 10h

GRADING SYSTEM

- Activity 1 (Laboratory practical) is repeated for each topic, twice for the first and once for the second, and is assessed within the denomination EV5 "Performance and quality of the work group (TG)". The set of two topics represent 25% of the final mark. It is an essential condition to pass the subject to have done the practices and present the reports associated with them.
- Activity 2 (Assessment test) is repeated for each topic and is assessed within the denomination EV1 "Written test of knowledge (PE)", with 30% of the final mark for each topic.
- The activity 3 (Delivery) is repeated for each topic and is assessed as EV3 "Work done throughout the course (TR)", with 15% of the final mark for the set of two topics.
- Students who have not passed one or more of the topics in Activity 2 it is recommended to recover the pending part in the final exam (Activity 4).

EXAMINATION RULES.

Each activity will be carried out according to the course schedule. An alternative day will be scheduled for students who are unable to perform one or more of the topics in Activity 1 on the day scheduled. Students who are unable to attend the tests in Activity 2 must sit the test in Activity 4. Activity 3 must be carried out on the day set.
BIBLIOGRAPHY

Basic:

Complementary: