Degree competences to which the subject contributes

- To know and understand the basic principles of Electromagnetism. To acquire the ability to analyse electric and magnetic fields, and to be able to solve simple electric circuits. To recognize the different electric and magnetic behaviours of matter.

- To know and be able to apply the fundamental concepts concerning waves, especially electromagnetic waves, and the phenomena linked to them.

- To learn how to use measuring instruments. To know how to estimate experimental uncertainties or errors. To be
able to carry out simple experiments, as well as to analyse and explain the results obtained.
- To know how to use the computer as a tool for computing and simulating physical processes.

### Study load

<table>
<thead>
<tr>
<th>Total learning time: 187h 30m</th>
<th>Hours large group: 67h 30m</th>
<th>36.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>7h 30m</td>
<td>4.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>112h 30m</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th><strong>(ENG) C1: Electric field and electric potential</strong></th>
<th><strong>Learning time:</strong> 32h 20m</th>
</tr>
</thead>
</table>
Practical classes: 8h  
Laboratory classes: 2h  
Self study: 18h 20m |

<table>
<thead>
<tr>
<th><strong>(ENG) C2: Conductors and dielectrics. Capacitors. Electric current</strong></th>
<th><strong>Learning time:</strong> 32h 20m</th>
</tr>
</thead>
</table>
Practical classes: 6h  
Laboratory classes: 2h  
Self study: 18h 20m |
| **Related activities:** Laboratory practice: V-I relationship in resistors and diodes |

<table>
<thead>
<tr>
<th><strong>(ENG) C3: Electromagnetism</strong></th>
<th><strong>Learning time:</strong> 34h 10m</th>
</tr>
</thead>
</table>
| Description: Force of a magnetic field on electric point charges and electric currents. Generation of magnetic fields by electric currents. Electromagnetic induction. | Theory classes: 6h  
Practical classes: 6h  
Laboratory classes: 0h  
Self study: 22h 10m |
| **Related activities:** Laboratory practice: Magnetic force on a current. |
(ENG) C4: Electromagnetic waves
Fundamentals of Optics

Learning time: 40h 40m
Theory classes: 6h 30m
Practical classes: 10h
Laboratory classes: 2h
Self study: 22h 10m

Description:
Reflection and refraction. Total internal reflection.

Related activities:
Laboratory practice: Law of refraction

(ENG) C6: Written tests. Simulations and other optional activities

Learning time: 14h
Laboratory classes: 1h 30m
Guided activities: 7h 30m
Self study: 5h

Description:
Written tests. Optionally, completion of assignments, as well as multi-choice questionnaires and PC simulations.
Checking of the knowledge and skills achievement level.

Qualification system

The mark will be the higher of both following results:

15% AC + 15% PL + 35% EP + 35% EF
15% AC + 15% PL + 70% EF

where the maximum value of every partial mark is 10. The partial marks are:
AC = mark for activities (problem solving, simulations, etc.) carried out along the course.
PL = mark for laboratory activities.
EP = mark for a first partial exam approximately at the middle of the semester.
EF = mark for a final exam.
Only this exam will be a re-evaluable test, with the established weighing of 70%.
Regulations for carrying out activities

Each exam will have two parts: a multi-choice questionnaire of theory questions and brief problems (up to 30% of the exam mark) and some problems to solve (up to completing 100%). To solve the problems, students may use a list of formulas as well as any additional material which the responsible lecturers will establish and announce sufficiently in advance. Only the final exam will be a re-evaluable test, with the established weighing of 70%.

As for the laboratory activities, the previous study or questionnaire as well as the activity report delivered at the end of the laboratory sessions will be graded. These laboratory activities will have 1.5 points over 10 in the final course mark. During the course, a series of activities will be established which students have to carry out individually or in groups, within the class session or outside it, as well as any other simulation tasks. The maximum mark for these activities will be 1.5 points over 10 in the final course mark.

Bibliography

Basic:

- Giró i Roca, Antoni; Canales Gabriel, Manel; Rey Oriol, Rossend; Sesé i Castel, Gemma; Trullàs i Simó, Joaquim. Física per a estudiants d’informàtica. Barcelona: Fundació per a la Universitat Oberta de Catalunya, 2005. ISBN 8497881443.

Complementary:


Others resources:

- Hyperlink
  - Curso Interactivo de física en internet. Simulacions de física per ordinador d’acceŀl lliure
  - Simulacions de física per ordinador d’accés lliure
  - Curso de Física Básica