Course guide
280601 - 280601 - Physics

Unit in charge: Barcelona School of Nautical Studies
Teaching unit: 748 - FIS - Department of Physics.
Degree: BACHELOR'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Compulsory subject).
Academic year: 2022 ECTS Credits: 9.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: ANTONIO ISALGUE BUXEDA

Others: Primer quadrimestre:
ANTONIO ISALGUE BUXEDA - Grup: GNTM
SERGIO MASSIP ALVAREZ - Grup: GNTM

Segon quadrimestre:
ANTONIO ISALGUE BUXEDA - Grup: GNTM
SERGIO MASSIP ALVAREZ - Grup: GNTM

REQUIREMENTS

- 

DEGREE COMPETENCES TO WHICH THE SUBJECT CONtributes

Specific:
2. Understanding and mastering the basics of the general laws of mechanics, thermodynamics, fields and waves and electromagnetism and their application to problem solving pro principles of engineering.

Generical:
1. ABILITY TO IDENTIFY AND SOLVE PROBLEMS IN THE FIELD OF ENGINEERING

TEACHING METHODOLOGY

Receive, understand and synthesize knowledge
Put out and solve problems and questions related to the subject
Develop reasoning and critical thinking, pose it and defend, in written or oral
Perform an individual work
Perform work in a reduced group.
These can be done in person, or with documental, CIT, digital campus, chat, video and videoconference.
LEARNING OBJECTIVES OF THE SUBJECT

Understand and dominate the basic concepts about general laws of mechanics, thermodynamics, fields and waves, and electromagnetism.

To apply fundamental concepts about physics principles in engineering problems.

Correctly pose the problems from the proposed statements and identify the options for their resolution. Apply the appropriate resolution methods. Carry out the tasks assigned in the time provided, in accordance with the guidelines set by the teacher or tutor. Identify progress in understanding and knowledge, and the degree of fulfillment of learning objectives.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided activities</td>
<td>9,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>9,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>36,0</td>
<td>16.00</td>
</tr>
<tr>
<td>Self study</td>
<td>126,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>45,0</td>
<td>20.00</td>
</tr>
</tbody>
</table>

Total learning time: 225 h

CONTENTS

**Mechanics.**

**Description:**

**Specific objectives:**
Understand and master the basic concepts about the general laws of mechanics.

Apply the basic physical principles of mechanics to the resolution of simple problems.

Propose and solve correctly the simple mechanical problems from the proposed statements and identify the options for their resolution.

**Related activities:**
Reading of chapters of books specified in the bibliography, or notes, or by means of video.
Listen to the teacher and participate in the problem-solving, in person, in video or on-line.
Solve problems individually.
Realization of three practices with simulators (computer), on relative movement, movement with friction, and stopping of boats, and deliver the reports

**Full-or-part-time:** 51h

Theory classes: 36h
Practical classes: 12h
Laboratory classes: 2h
Guided activities: 1h
### Oscillations.

**Description:**

**Specific objectives:**
Understand and master the basic concepts about the general laws of vibrations. Propose and solve correctly the simple problems of oscillations from the proposed statements.

**Related activities:**
Read the book chapters related to the oscillations of some of the recommended bibliography books, or notes or recommended videos. Listen to the teacher the indications on the ways to solve the simple exercises, presentially or on video, or on-line. Perform simple exercises on oscillations, autonomously. Perform a practice with pendulums, to evaluate the value of gravity and estimate the error, and deliver the report.

**Full-or-part-time:** 30h
- Theory classes: 24h
- Practical classes: 6h

---

### Waves.

**Description:**

**Specific objectives:**
Understand and master the basic concepts about the general laws of the waves. Propose and solve correctly the wave problems from the proposed basic statements.

**Related activities:**
Read the chapters corresponding to waves in one of the books of the recommended basic bibliography, or in notes or on recommended videos. Listen to the teacher’s instructions on solving problems, directly, on video or on-line. Perform three practices with a computer simulator on aspects of waves, and deliver the reports.

**Full-or-part-time:** 50h
- Theory classes: 10h
- Practical classes: 10h
- Laboratory classes: 6h
- Self study: 24h
Termodinàmica i propietats tèrmiques de la matèria.

**Description:**

**Specific objectives:**
Understand and master the basic concepts about the general laws of Thermodynamics.
Propose and solve correctly the simple problems of thermodynamics from the basic statements proposed

**Related activities:**
Read the chapters corresponding to thermodynamics in one of the books of the recommended basic bibliography, or on notes or on recommended videos.
Listen to the teacher's instructions on solving problems, directly, on video or on-line.
Perform an experimental practice (the cooling of a body) with a digital thermometer, write the report and deliver it.

**Full-or-part-time:** 40h
Theory classes: 30h
Practical classes: 8h
Laboratory classes: 2h

Electricitat i magnetisme.

**Description:**

**Specific objectives:**
Understand and master the basic concepts about the general laws of electromagnetism.
Propose and solve correctly the simple problems on the magnetic field and its interaction with electric currents and magnetic moments from the proposed basic statements

**Related activities:**
Read the chapters corresponding to waves in one of the books of the recommended basic bibliography, or on notes, or on recommended videos.
Listen to the teacher’s instructions on solving problems, directly or on video or on-line.
Perform an experimental practice (magnetic field of a magnet and its interaction with a compass), write the report, and deliver it.

**Full-or-part-time:** 32h
Theory classes: 24h
Practical classes: 6h
Laboratory classes: 2h
Electromagnetic waves, light and properties.

Description:

Specific objectives:
Understand and master the basic concepts about the general laws of electromagnetic waves.

Related activities:
Read the chapters corresponding to electromagnetic waves in some of the books of the recommended basic bibliography, or on notes or on recommended videos.
Solve some problems on the subject

Full-or-part-time: 22h
Theory classes: 16h
Practical classes: 4h
Laboratory classes: 2h

GRADING SYSTEM

Practical works are mandatory (to do and perform the deliveries). To succeed in the subject, the students have to have a qualification of more or equal to 5 over 10 in practical works. To achieve a numeric final qualification (Nfinal), different from NP (not presented), the students have to deliver the compromise of academic integrity signed, and they have to have done at least the 80% of evaluable activities (Practical works + Continuous Evaluation exercises and deliveries)

Final qualification results from:

\[ N_{\text{final}} = 0.45 \times N_{\text{pf}} + 0.25 \times N_{\text{pract}} + 0.30 \times N_{\text{parcials}} \]

(\(N_{\text{pf}}\) = nota de proves finals; \(N_{\text{pract}}\) = nota de practiques i simuladors; \(N_{\text{parcials}}\) = nota d'avaluació continua i lliuraments i exercicis parcials)

The students that do not succeed will be able to, according to the norms from the University and the Center, to be re-evaluated, in the dates determined by the Center. In the re-evaluation, grades on practical exercises, deliveries and other activities (Nac) will be taken into account and can be completed, presenting them at the moment of re-evaluation exercises, which will be graded as Nre. For the students who are re-evaluated, the final grade will be:

\[ N_{\text{final}} = 0.75 \times N_{\text{re}} + 0.25 \times N_{\text{pract}} \]

Nfinal: final qualification.
Npf: qualification of the final exercises.
Npract: qualification from lab work and simulators work.
Nparcials: qualification of partial exercises and deliveries.

Partial exercises will span up to 3 h each

EXAMINATION RULES.

.It is mandatory to perform the practical works to succeed in the course
Activities not performed by the student will not receive a grade
The Not-presented grade will be given if a student does not perform evaluation exercises worth 20% of total grade or more.
# BIBLIOGRAPHY

**Basic:**

**Complementary:**

**RESOURCES**

**Hyperlink:**
- [http://baldufa.upc.es/](http://baldufa.upc.es/). Hi ha alguns resums de teoria i exemples visuals, a més de problemes i qüestions