Course guide  
280603 - 280603 - Informatics  

Unit in charge: Barcelona School of Nautical Studies  
Teaching unit: 707 - ESAII - Department of Automatic Control.  
Degree: BACHELOR'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Compulsory subject).  
Academic year: 2022  
ECTS Credits: 6.0  
Languages: Catalan, English

LECTURER

Coordinating lecturer: FRANCISCO JAVIER AYMERICH MARTINEZ - JORDI FONOLLOSA MAGRINYA  
Primer quadrimestre:  
JORDI FONOLLOSA MAGRINYA - Grup: GNTM1, Grup: GNTM2  
Segon quadrimestre:  
FRANCISCO JAVIER AYMERICH MARTINEZ - Grup: GNTM

Others:  
Primer quadrimestre:  
FRANCISCO JAVIER AYMERICH MARTINEZ - Grup: GNTM1, Grup: GNTM2  
FIDEL BONET VILELA - Grup: GNTM1, Grup: GNTM2  
JORDI FONOLLOSA MAGRINYA - Grup: GNTM1, Grup: GNTM2  
MARIA ÁNGELES FUENTES EXPÓSITO - Grup: GNTM1, Grup: GNTM2  

Segon quadrimestre:  
FRANCISCO JAVIER AYMERICH MARTINEZ - Grup: GNTM  
MARIA ÁNGELES FUENTES EXPÓSITO - Grup: GNTM

REQUIREMENTS

One group (problem + laboratory) will be in English. Check the schedule for further details.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:  
2. Basic knowledge on using and programming computers, operating systems, databases and computer programs for engineering applications.

Transversal:  
1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

TEACHING METHODOLOGY
LEARNING OBJECTIVES OF THE SUBJECT

When the student completed the course must be able to:
- Describe a computer from the point of view of its architecture and structure.
- Describe the computer operational system functions.
- Make programs in high-level computer languages.
- Design databases and use computer applications used in marine engineering.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>15.0</td>
<td>10.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6.0</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>15.0</td>
<td>10.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30.0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84.0</td>
<td>56.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

(ENG) Theme 1: Introduction to computers

Description:
The computers, architecture and structure of the computer systems. Introduction to the operating systems.

Full-or-part-time: 12h
- Theory classes: 4h
- Self study: 8h

(ENG) Theme 2.1: Introduction to digital systems

Description:
Systems and signals, computer structures, numerical systems and binary arithmetic, coding information.

Full-or-part-time: 10h
- Theory classes: 2h
- Practical classes: 2h
- Guided activities: 2h
- Self study: 6h

(ENG) Theme 2.2: Logic functions and combinational systems

Description:
The logic and the Boole algebra, logic functions, functions simplification, implementation and synthesis of logic functions, combinational blocs.

Full-or-part-time: 18h
- Theory classes: 4h
- Practical classes: 2h
- Laboratory classes: 2h
- Guided activities: 2h
- Self study: 8h
<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Full-or-part-time</th>
<th>Theory classes</th>
<th>Practical classes</th>
<th>Laboratory classes</th>
<th>Guided activities</th>
<th>Self study</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>Sequential systems</td>
<td>Concepts and definitions, bistables, implementation of sequential systems, registers, counters, memories.</td>
<td>17h</td>
<td>3h</td>
<td>2h</td>
<td>2h</td>
<td>8h</td>
</tr>
<tr>
<td>2.4</td>
<td>Basic structure of the computers</td>
<td>Basic computer design: instruction set, format of the instructions, process sub-system, control sub-system.</td>
<td>8h</td>
<td>2h</td>
<td>2h</td>
<td>4h</td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Introduction to algorithmic</td>
<td>Concepts and definitions, downstream analysis: program design cycle, introduction to C language, functions and procedures.</td>
<td>14h</td>
<td>4h</td>
<td>2h</td>
<td>2h</td>
<td>6h</td>
</tr>
<tr>
<td>3.2</td>
<td>Basic algorithmic structures</td>
<td>Instructions organization: Sequential structures, conditional structures, iterative structures, program execution: the program trace.</td>
<td>20h</td>
<td>2h</td>
<td>4h</td>
<td>2h</td>
<td>8h</td>
</tr>
</tbody>
</table>
### (ENG) Theme 3.3: Algorithmic structures

**Description:**
The list. Creating a list, move through structures and search structures.

**Full-or-part-time:** 18h  
Theory classes: 2h  
Practical classes: 2h  
Laboratory classes: 4h  
Guided activities: 2h  
Self study: 8h

### (ENG) Theme 4.1: Introduction to local area networks

**Description:**
Local area networks types, networks components, architecture, protocols and services in a network.

**Full-or-part-time:** 16h  
Theory classes: 4h  
Practical classes: 2h  
Laboratory classes: 2h  
Self study: 8h

### (ENG) Theme 4.2: The NMEA bus

**Description:**
The NMEA bus as a network. Physical elements that can be communicated by the NMEA bus. The NMEA sentences.

**Full-or-part-time:** 7h  
Theory classes: 1h  
Laboratory classes: 2h  
Self study: 4h

### (ENG) Theme 5: Marine computer applications

**Description:**
Management of computer applications for the use in the marine environment. Design and use of databases.

**Full-or-part-time:** 10h  
Theory classes: 2h  
Guided activities: 2h  
Self study: 6h
**GRADING SYSTEM**

The final qualification is the sum of the following partial marks:

\[ N_{final} = 0.4 N_{pf} + 0.3 N_{ac} + 0.2 N_{eL} + 0.1 N_{ad} \]

where

- \( N_{final} \): final qualification of the subject
- \( N_{pf} \): final test grade, is the grade obtained in the final exam
- \( N_{ac} \): Continuous assessment grade
- \( N_{eL} \): qualification of laboratory teaching (internships in the computer room)
- \( N_{ad} \): qualification of the directed activities

Continuous assessment (\( N_{ac} \)) consists of conducting partial assessment tests throughout the course, one of digital systems (topics 1 and 2), one of algorithms (topic 3) and one of communications networks (topic 4), with the following weights:

\[ N_{ac} = 0.4 \times T_{1-2} + 0.35 \times T_{3} + 0.25 \times T_{4} \]

The final exam grade (\( N_{pf} \)) is calculated according to the weights:

\[ N_{pf} = 0.4 \times T_{1-2} + 0.35 \times T_{3} + 0.25 \times T_{4} \]

If a grade of 3 or higher is not achieved in all parts (\( T_{1-2} \), \( T_{3} \) and \( T_{4} \)) of the final exam, the formula will be applied but \( N_{final} \) cannot be higher than 3.0.

It will be considered as Not presented to all students who do not submit the final exam.

The evaluation of the teachings in the laboratory (\( N_{eL} \)) takes into account the activity carried out in the computer room, the reports delivered and the mark of two tests on the lab work of topics 2 and 3 respectively, with the following weighting:

\[ N_{eL} = 0.3 \times IP_{2} + 0.2 \times TP_{2} + 0.3 \times IP_{3} + 0.2 \times TP_{3} \]

on

- \( IP_{2}, IP_{3} \): Qualification of the reports of lab work of the subject 2 and of the subject 3
- \( TP_{2}, TP_{3} \): Qualification of the tests of lab work of the subject 2 and of the subject 3

The evaluation of the directed activities (\( N_{ad} \)) consists of doing outside the classroom and delivering different activities (directed works), of an additive and formative nature.

All laboratory activities, examinations or supervised activities, which are not carried out will be evaluated with a zero, as long as there has not been a justified reason.

Re-evaluation

All the students who obtain a grade equal to or higher than 3 and lower than 5 will be entitled to a re-assessment test consisting of a written exam that will include the entire syllabus of the course.

**EXAMINATION RULES.**

All of lab activities, tests or guided activities that are not carried out will be evaluated with zero, whenever that there has not been justifiable reason.

It will be considered as not presented all the students who do not present to the final exam.
BIBLIOGRAPHY

Basic: