280603 - Informatics

Coordinating unit: 280 - FNB - Barcelona School of Nautical Studies
Teaching unit: 707 - ESAII - Department of Automatic Control
Academic year: 2019
Degree: BACHELOR'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6  Teaching languages: Catalan, English

Teaching staff

Coordinator: JORDI FONOLLOSA MAGRINYA

Others: Primer quadrimestre:
FRANCISCO JAVIER AYMERICH MARTINEZ
JORDI FONOLLOSA MAGRINYA

Segon quadrimestre:
FRANCISCO JAVIER AYMERICH MARTINEZ
JORDI FONOLLOSA MAGRINYA
MISLAV JORDANIC

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.

Learning objectives of the subject

When the student completed the curse 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>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>15h</td>
<td>10.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>15h</td>
<td>10.00%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>6h</td>
<td>4.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>84h</td>
<td>56.00%</td>
</tr>
</tbody>
</table>
# Content

<table>
<thead>
<tr>
<th>(ENG) Theme 1: Introduction to computers</th>
<th>Learning time: 12h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 4h</td>
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<tr>
<td></td>
<td>Self study: 8h</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>(ENG) Theme 2.1: Introduction to digital systems</th>
<th>Learning time: 10h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 6h</td>
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</table>

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

<table>
<thead>
<tr>
<th>(ENG) Theme 2.2: Logic functions and combinational systems</th>
<th>Learning time: 18h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 4h</td>
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<tr>
<td></td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 8h</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>(ENG) Theme 2.3: Sequential systems</th>
<th>Learning time: 17h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 8h</td>
</tr>
</tbody>
</table>

**Description:**
Concepts and definitions, bistables, implementation of sequential systems, registers, counters, memories.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Learning time</th>
<th>Description</th>
</tr>
</thead>
</table>
| **(ENG) Theme 2.4: Basic structure of the computers** | 8h | Theory classes: 2h  
Guided activities: 2h  
Self study : 4h  
**Description:**  
Basic computer design: instruction set, format of the instructions, process sub-system, control sub-system. |
| **(ENG) Theme 3.1: Introduction to algorithmic** | 14h | Theory classes: 4h  
Practical classes: 2h  
Guided activities: 2h  
Self study : 6h  
**Description:**  
Concepts and definitions, downstream analysis: program design cycle, introduction to C language, functions and procedures. |
| **(ENG) Theme 3.2: Basic algorithmic structures** | 20h | Theory classes: 2h  
Practical classes: 4h  
Laboratory classes: 2h  
Guided activities: 4h  
Self study : 8h  
**Description:**  
Instructions organization: Sequential structures, conditional structures, iterative structures, program execution: the program trace. |
| **(ENG) Theme 3.3: Algorithmic structures** | 18h | Theory classes: 2h  
Practical classes: 2h  
Laboratory classes: 4h  
Guided activities: 2h  
Self study : 8h  
**Description:**  
The list. Creating a list, move through structures and search structures. |
### (ENG) Theme 4.1: Introduction to local area networks

**Learning time:** 16h  
- Theory classes: 4h  
- Practical classes: 2h  
- Laboratory classes: 2h  
- Self study: 8h  

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

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

**Learning time:** 7h  
- Theory classes: 1h  
- Laboratory classes: 2h  
- Self study: 4h  

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

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

**Learning time:** 10h  
- Theory classes: 2h  
- Guided activities: 2h  
- Self study: 6h  

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

Evaluation

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

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

where

- \( N_{\text{final}} \): final qualification.
- \( N_{\text{pf}} \): this is the qualification obtained in the final exam.
- \( N_{\text{ac}} \): this is the qualification obtained in the continuous evaluation.
- \( N_{\text{eL}} \): this is the qualification obtained in the laboratory (practice works in the informatics classroom).
- \( N_{\text{ad}} \): this is the qualification obtained in the guided activities.

The continuous evaluation (\( N_{\text{ac}} \)) will consist of the carrying out of partial exams throughout the course, one of digital systems (units 1 and 2), one of algorithmic (unit 3) and one of networks and applications (units 4 and 5), with the following weightings:

\[ N_{\text{ac}} = 0.35 \times T1-2 + 0.35 \times T3 + 0.3 \times T4-5 \]

The evaluation of the teaching in the laboratory (\( N_{\text{eL}} \)) will take into account the \( N_{\text{eLc}} \) note corresponding to the work in the computer room (activity and report) and the note of two written tests, PT2 (test on the practices of Unit 2) and PT3 (Test on the practices of the Unit 3)

\[ N_{\text{eL}} = 0.3 \times PT1 + 0.3 \times PT2 + 0.4 \times N_{\text{eLc}} \]

where

- \( N_{\text{eLc}} \): this is the qualification obtained in the reports carried out at the classroom (laboratory, informatics classroom).

\[ N_{\text{eLc}} = 0.5 \times N_{\text{eLcT2}} + 0.5 \times N_{\text{eLcT3}} \]

\( N_{\text{eLcT2}} \): this is the qualification obtained in the classroom report of Unit 2.
\( N_{\text{eLcT3}} \): this is the qualification obtained in the classroom report of Unit 3.

The evaluation of the guided activities (\( N_{\text{ad}} \)) is:

\[ N_{\text{ad}} = 0.3 \times N_{\text{adT2}} + 0.4 \times N_{\text{adT3}} + 0.3 \times N_{\text{adT4-5}} \]

where

- \( N_{\text{adT2}} \): this is the qualification obtained in the guided activities of Unit 2.
- \( N_{\text{adT3}} \): this is the qualification obtained in the guided activities of Unit 3.
- \( N_{\text{adT4-5}} \): this is the qualification obtained in the guided activities of Unit 4-5.

The evaluation of the guided activities is to perform different activities, individual and formative nature made during the year (outside the classroom).

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.

Re-evaluation
All those students who obtain a grade equal to or greater than 3 and less than 5 will be entitled to a re-evaluation test.

**Regulations for carrying out activities**

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:**


