280635 - Informatics

**Coordinating unit:** 280 - FNB - Barcelona School of Nautical Studies
**Teaching unit:** 707 - ESAII - Department of Automatic Control

**Academic year:** 2018

**Degree:**
- BACHELOR'S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Teaching unit Compulsory)
- BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
- BACHELOR'S DEGREE IN MARINE TECHNOLOGIES/BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2016). (Teaching unit Compulsory)

**ECTS credits:** 6

**Teaching languages:** Catalan

### Teaching staff

**Coordinator:** ALEJANDRO BACHILLER MATARRANZ

**Others:**
- Primer quadrimestre:
  - FRANCISCO JAVIER AYMERICH MARTINEZ - 1
  - ALEJANDRO BACHILLER MATARRANZ - 1
  - ROSA M. FERNANDEZ CANTI - 1
  - JORDI FONOLLOSA MAGRINYA - 1

- Segon quadrimestre:
  - FRANCISCO JAVIER AYMERICH MARTINEZ - 1
  - ALEJANDRO BACHILLER MATARRANZ - 1
  - ROSA M. FERNANDEZ CANTI - 1
  - JORDI FONOLLOSA MAGRINYA - 1

### Degree competences to which the subject contributes

**Specific:**
1. Basic knowledge on using and programming computers, operating systems, databases and computer programs for engineering applications.
2. Basic knowledge on using and programming computers, operating systems, databases and software with application in the field of naval engineering technology.

**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

- Receive, understand and synthesize knowledge.
- Pose and solve problems.
- Develop the reasoning and critical thinking and defend it in an oral or written way.
- Work individually and in a team.

### Learning objectives of the subject

Once completed the computer course, the student must be able to:
1. Describe a computer from the point of view of their functional and physical model.
2. Explain the functions of a computer operating system.
3. Perform computer programs using high-level languages.
4. Describe the components and functions of a local area network.
5. Manage computer applications for the use in the marine environment and design a database.

This course will evaluate the following STCW competences: A-III/1 - 6. Operate electrical, electronic and control systems, including the KUP A-III/1 - 6.1 Basic configuration and operation principles of electrical, electronic and control equipment; A-III/6 - 5. Operate computers and computer networks on ships, including the KUP A-III/6 - 5.1 Understanding of 1. main features of data processing, 2. construction and use of computer networks on ships and 3. bridge-based, engine-room-based and commercial computer use.

**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>
</tr>
<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

### (ENG) Unit 1: Introduction to computers

**Learning time:** 12h  
- Theory classes: 4h  
- Self study: 8h  

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

| (ENG) Unit 2.1: Introduction to digital systems  
(A-III/1 - 6.1, A-III/6 - 5.1) | **Learning time:** 10h  
- Theory classes: 2h  
- Practical classes: 2h  
- Self study: 6h  

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

| (ENG) Unit 2.2: Logic functions and combinational systems | **Learning time:** 18h  
- Theory classes: 4h  
- Practical classes: 2h  
- Laboratory classes: 2h  
- Guided activities: 2h  
- Self study: 8h  

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

| (ENG) Unit 2.3: Sequential systems  
(A-III/1 - 6.1, A-III/6 - 5.1) | **Learning time:** 17h  
- Theory classes: 3h  
- Practical classes: 2h  
- Laboratory classes: 2h  
- Guided activities: 2h  
- Self study: 8h  

**Description:**  
Concepts and definitions, biestables, implementation of sequential systems, registers, counters, memories.
### (ENG) Unit 2.4: Basic structure of the computers
(A-Ill/1 - 6.1, A-Ill/6 - 5.1)

**Description:**
Basic computer design: instruction set, format of the instructions, process sub-system, control sub-system.

**Learning time:** 8h
- Theory classes: 2h
- Guided activities: 2h
- Self study: 4h

### (ENG) Unit 3.1: Introduction to algorithmic

**Description:**
Concepts and definitions, downstream analysis: program design cycle, introduction to C language, functions and procedures.

**Learning time:** 14h
- Theory classes: 4h
- Practical classes: 2h
- Guided activities: 2h
- Self study: 6h

### (ENG) Unit 3.2: Basic algorithmic structures

**Description:**
Instructions organization: Sequential structures, conditional structures, iterative structures, program execution: the program trace.

**Learning time:** 20h
- Theory classes: 2h
- Practical classes: 4h
- Laboratory classes: 2h
- Guided activities: 4h
- Self study: 8h
### (ENG) Unit 3.3: Algorithmic structures

**Learning time:** 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) Unit 4.1: Introduction to local area networks (A-III/6 - 5.1)

**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) Unit 4.2: The NMEA bus (A-III/6 - 5.1)

**Learning time:** 7h  
Theory classes: 1h  
Guided activities: 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) Unit 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

Grading

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

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

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:

\[ N_{\text{ad}} = 0.3 \times N_{\text{adT1-2}} + 0.4 \times N_{\text{adT3}} + 0.3 \times N_{\text{adT4-5}} \]

where

- \( N_{\text{adT1-2}} \): this is the qualification obtained in the guided activities of Unit 1-2.
- \( N_{\text{adT3}} \): 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 as zero, if there has not been a justified reason.
The students who do not attend to the final exam will be graded as Not presented.

**Bibliography**

**Basic:**