



Course guide

280603 - 280603 - Informatics

Last modified: 17/01/2024

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: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, English

LECTURER

Coordinating lecturer: JORDI FONOLLOSA MAGRINYA - FRANCISCO JAVIER AYMERICH MARTINEZ

Others:

Primer quadrimestre:
JORDI FONOLLOSA MAGRINYA - GNTM1, GNTM2
MARC JOVÉ BUENO - GNTM1, GNTM2
GINES YAÑEZ SAURA - GNTM1, GNTM2

Segon quadrimestre:
FRANCISCO JAVIER AYMERICH MARTINEZ - GNTM
MARC JOVÉ BUENO - 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

Type	Hours	Percentage
Hours small group	15,0	10.00
Hours medium group	15,0	10.00
Hours large group	30,0	20.00
Guided activities	6,0	4.00
Self study	84,0	56.00

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

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

(ENG) Theme 2.3: Sequential systems

Description:

Concepts and definitions, biestables, implementation of sequential systems, registers, counters, memories.

Full-or-part-time: 17h

Theory classes: 3h

Practical classes: 2h

Laboratory classes: 2h

Guided activities: 2h

Self study : 8h

(ENG) Theme 2.4: Basic structure of the computers

Description:

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

Full-or-part-time: 8h

Theory classes: 2h

Guided activities: 2h

Self study : 4h

(ENG) Theme 3.1: Introduction to algorithmic

Description:

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

Full-or-part-time: 14h

Theory classes: 4h

Practical classes: 2h

Guided activities: 2h

Self study : 6h

(ENG) Theme 3.2: Basic algorithmic structures

Description:

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

Full-or-part-time: 20h

Theory classes: 2h

Practical classes: 4h

Laboratory classes: 2h

Guided activities: 4h

Self study : 8h

(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:

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

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:

$$N_{\text{ac}} = 0.4 \times T1-2 + 0.35 \times T3 + 0.25 \times T4$$

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

$$N_{\text{pf}} = 0.4 \times T1-2 + 0.35 \times T3 + 0.25 \times T4$$

If a grade of 3 or higher is not achieved in all parts ($T1-2$, $T3$ and $T4$) 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:

$$N_{\text{eL}} = 0.3 \times IP2 + 0.2 \times TP2 + 0.3 \times IP3 + 0.2 \times TP3$$

on

$IP2$, $IP3$: Qualification of the reports of lab work of the subject 2 and of the subject 3

$TP2$, $TP3$: 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:

- Stroustrup, Bjarne; Aranda González, Virginia. Un recorrido por C++. Tercera actualització. Madrid: Anaya Multimedia, [2023]. ISBN 9788441548213.
- Arduino : trucos y secretos : 120 ideas para crear sus proyectos [on line]. Barcelona: Marcombo, 2019 [Consultation: 23/09/2022]. Available on : <https://web-p-ebshost-com.recursos.biblioteca.upc.edu/ehost/ebookviewer/ebook?sid=b0f78800-0ce5-40e2-b2b3-e736dbc76a71%40redis&vid=0&format=EK>. ISBN 9788426727756.
- Banzi, Massimo. Getting started with Arduino. 2nd ed. Sebastopol: O'Reilly, 2011. ISBN 9781449309879.
- Margolis, Michael; Jepsen, Brian; Weldin, Nicholas Robert. Arduino cookbook : recipes to begin, expand, and enhance your projects [on line]. 3rd ed. Sebastopol: O'Reilly Media, [April 2020] [Consultation: 11/10/2023]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6177122>. ISBN 9781491903506.
- Banzi, Massimo; Shiloh, Michael. Introducción a Arduino : edición 2016. Madrid: Anaya, cop. 2016. ISBN 9788441537446.
- Abad Domingo, Alfredo. Redes de área local. Madrid: McGraw-Hill, 2005. ISBN 844819974X.
- Tokheim, Roger L. Principios digitales. 3a ed. Madrid: McGraw-Hill, 1995. ISBN 8448117379.
- Schildt, Herbert. Turbo C/C++ 3.1 : manual de referencia. Madrid: McGraw-Hill, 1994. ISBN 8448118561.
- Trill i mollà, Albert. Informàtica bàsica 1. Vol. 1 Introducció a la informàtica. Barcelona: ETSEIB. CPDA, 1990.
- Castro Rabal, Jorge. Curso de programación. Madrid: McGraw-Hill, 1993. ISBN 8448119592.
- Liu, Christine ; Johnson, Tera. The Computer science activity book : 24 Pen-and-Paper projects to explore the wonderful world of coding. San Francisco: No Starch Press, 2019. ISBN 9781593279103.
- Rubio-Sánchez, Manuel. Introduction to recursive programming. Boca Raton: CRC Press, 2017. ISBN 9781498735285.
- Anthropy, Anna. Make your own twine games!. San Francisco: No Starch Press, 2019. ISBN 9781593279387.

Complementary:

- Culkin, Jody ; Hagan, Eric. Aprende electrónica con Arduino : una guía ilustrada para principiantes sobre la informática física / Jody Culkin y Eric Hagan [on line]. Barcelona: Marcombo, [2019] [Consultation: 28/07/2023]. Available on: <https://search-ebshost-com.recursos.biblioteca.upc.edu/login.aspx?direct=true&AuthType=ip,uid&db=nlebk&AN=2749567&site=ehost-live&ebv=EK&ppid=Page-1>. ISBN 84-267-2762-X.
- Goilav, Nicolas. Arduino : aprender a desarrollar para crear objetos inteligentes [on line]. Cornellà de Llobregat: ENI, 2016 [Consultation: 16/12/2022]. Available on: <https://www-eni-training-com.recursos.biblioteca.upc.edu/portal/client/mediabook/home>. ISBN 9782409000447.