



Course guide

230005 - FO - Fundamentals of Computers

Last modified: 25/05/2023

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 701 - DAC - Department of Computer Architecture.

Degree: BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Consultar aquí / See here:
<https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/responsables-assignatura>

Others: Consultar aquí / See here:
<https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/professorat-assignat-idioma>

PRIOR SKILLS

This course has no prerequisites.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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

Practical classes
Theory classes
Laboratory classes
Team work (no presential)
Self study (no presential)
Quizzes
Final exam
Laboratory practices
Project

LEARNING OBJECTIVES OF THE SUBJECT

The goals of this course are that:

1. The student must be able to code, test, and debug programs using the C language to solve elementary problems.
2. The student understands and masters the basics of procedural programming and uses the top-down design technique to solve the problems raised.
3. The student must understand what is about an operating system and its role on a computer functionality. He or She must know basic commands of a general purpose operating system.

Learning outcomes:

1. To Know the operation of a basic computer and how develop simple programs using it.
2. To use automatic tools for editing, compiling, running and debugging programs.
3. To correctly state the problem structure from a given problem description and identify alternative solutions.
4. To apply a suitable resolution choice and prove the correctness of that solution.
5. To know and correctly use the tools, instruments and applications, available at the lab, and properly achieve the analysis of the collected data.
6. To complete assigned tasks on a given schedule following the guidelines set by the course's profesor. The student must also be able to assess his or her work's progress, and the degree of fulfillment of this course's objectives.

STUDY LOAD

Type	Hours	Percentage
Self study	85,0	56.67
Hours large group	39,0	26.00
Hours small group	26,0	17.33

Total learning time: 150 h

CONTENTS

Topic 1. Basic computer architecture

Description:

Basic structure of a computer: memory, I/O and CPU. Description of the three subsystems. Representation of the information. Memory units. Process of implementation of a program.

Full-or-part-time: 7h

Theory classes: 3h

Laboratory classes: 2h

Self study : 2h

Topic 2. Basic programming concepts

Description:

Basic terms: algorithms, programs, languages. Stages in the development of a program. Process of coding and testing of a program. Structure of a program. Constants, variables, expressions, statements. Elementary data types. Type conversion. Arithmetical, logical and relational operators. Priority of operators.

Full-or-part-time: 25h 40m

Theory classes: 12h

Laboratory classes: 4h

Self study : 9h 40m

Topic 3. Flow control statements

Description:

Conditional sentences. Iterative sentences. Nesting of statements. Basic algorithms.

Full-or-part-time: 32h

Theory classes: 12h

Laboratory classes: 4h

Self study : 16h

Topic 4. Data structures

Description:

Vectors. Matrices. Structs. Definition. Data using vectors, matrices and structs. Basic algorithms: Search, insertion and elimination.

Full-or-part-time: 38h

Theory classes: 12h

Laboratory classes: 6h

Self study : 20h

Topic 5. Functions

Description:

Definition and calls. Parameters (formal and real parameters, pass by value and by reference). Pointers. Input and output parameters. Top-Down methodology. Decomposition problems. Abstract type data.

Full-or-part-time: 40h 20m

Theory classes: 16h

Laboratory classes: 4h

Self study : 20h 20m

Topic 6. Files

Description:

Management of files.

Full-or-part-time: 7h

Theory classes: 3h

Laboratory classes: 2h

Self study : 2h

GRADING SYSTEM

Laboratory (40%) = (30% - 50%) Quizz + (70% - 50%)Project (Non-reevaluable act)

Quizzes theoretical (0% - 20%)

Final exam (40% - 60%)

BIBLIOGRAPHY

Basic:

- Peña Basurto, M.A.; Cela Espín, J.M. Introducción a la programación en C [on line]. Barcelona: Edicions UPC, 2000 [Consultation: 08/05/2020]. Available on: <http://hdl.handle.net/2099.3/36245>. ISBN 8483014297.
- Jimenéz, M.; Otero, B. Fundamentos de ordenadores: programación en C [on line]. Barcelona: Iniciativa Digital Politècnica, 2013 [Consultation: 14/10/2022]. Available on: <http://hdl.handle.net/2099.3/36593>. ISBN 9788476539958.

Complementary:

- Gottfried, B.S. Programación en C. 2a ed. rev. Madrid: McGraw-Hill, 2005. ISBN 8448198468.
- Stallings, W. Organización y arquitectura de computadores [on line]. 7a ed. Madrid: Prentice Hall, 2006 [Consultation: 24/11/2020]. Available on: http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1266. ISBN 8489660824.