COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI ICADE CIHS

Syllabus
2025 - 2026

GENERAL INFORMATION

Data of the subject	
Subject name	Fundamentals of Computer Science
Subject code	DTC-GITI-112
Mainprogram	Bachelor's Degree in Engineering for Industrial Technologies
Involved programs	Grado en Ingeniería en Tecnologías Industriales y Grado en Administración y Dirección de Empresas [First year] Grado en Ingeniería en Tecnologías Industriales [First year]
Credits	7,5 ECTS
Type	Básico
Department	Department of Telematics and Computer Sciencies

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DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Prerequisites

None

Course contents

Contents

Topic 1: INTRODUCTION. BASIC ARCHITECTURE AND OPERATING SYSTEMS.

Computer structure, HW and SW components, operating system, and programs.

Topic 2: BASIC PROGRAMMING CONCEPTS.

Program design. Modular programming. Structured programming. Application of quality principles.

Topic 3: INTRODUCTION TO THE LANGUAGE.

Basic concepts. Data types. Constants. Variables. Expressions. Basic input/output functions.

Topic 4: OPERATORS AND EXPRESSIONS.

Arithmetic, relational and logical operators.

Topic 5: FLOW CONTROL INSTRUCTIONS.

Instructions if-else, switch, for, while, do-while.

Topic 6: FUNCTIONS.

Declaration and use of functions. Passing arguments. Scope of variable declaration. Recursion.

Topic 7: VECTORS AND CHARACTER CHAINS.

One-dimensional vectors, declaration, processing, reading, and writing. Character strings, multidimensional vectors.

MEMORY MANAGEMENT AND POINTERS.

Pointers and operations with pointers. Pointers, functions, and vectors. Memory management: dynamic memory allocation.

Topic 9. STRUCTURES.

Definition of a structure. Structure processing. Structure vectors. Pointers to structures. Structures and functions.

Topic 10. DATA FILES.

Opening and closing a file. Text files. Binary files.

Topic 11. DATABASES.

Types of databases and managers. Tables and relations. Basic operations of query, insertion, and deletion.

Topic 12. PRACTICAL SESSIONS.

In all the topics, the students will carry out practical sessions in which they will have to solve the problems posed with a creative and critical spirit, deciding the best and most efficient solution in each case. Organization of the algorithm to be programmed.

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Exams: Theoretical and practical exams. - Intersemester test. - Problem-solving exam.	- Intersemester test (25%): Test of comprehension of the theoretical contents applied to the analysis and resolution of problems using the programming language defined in the course. - Problem-solving exam (35%): The student's capacity and skills for analyzing and resolving problems with proposed solutions in the defined programming language will be evaluated. It will be considered in the evaluation, the clarity of the answers, and the following of the programming rules established in the subject.	60
Continuous evaluation of performance: - Individual or group practical work. - Projects developed by the students.	- There will be a set of follow-up test/s, which will	

- Exercises or problems solved individually or in groups. - Short tests of continuous evaluation. - Class participation. - Attendance and attitude in class.	allow evaluation of the evolution of the student in understanding the course concepts and their ability to solve problems through proposals developed in the programming language defined in the course.	10
Evaluation of the experimental work: -Evaluation tests of the experimental work. -Participation in the laboratory. -Individual or group laboratory practice reports.	- Complete program exam (25%): The student's capacity to develop a complete solution to a proposed problem will be evaluated and must be created using the language defined in the course. The ability for analysis, problem-solving, and programming skills will be considered. - Laboratory Reports (5%): Weekly practices in laboratory classes. Their completion and delivery on time will be evaluated, as well as their participation and attitude in class.	30

Grading

Regular call

The percentage for the final grade will be:
- Mid-term test (25%)
- Problem-solving exam (35%)
- Complete program exam (25%)
- Test/s (10%)
- Laboratory reports (5%)

The minimum grade for both the "Problem Solving Exam" and the "Complete Program Exam" is 4. If any of these exams is lower than 4, this will be the course's final grade.
Delivering on time of all the "Laboratory Reports" is mandatory to pass the course.

Retake call

The percentage for the final grade will be:
- Problem-solving exam of the extraordinary call (60%).
- Exam of the complete program of the extraordinary call (25%)
- Test/s (10%)
- Laboratory reports (5%)

The minimum grade for both the "Problem-solving exam" and the "Complete program exam" is 4. If the grade of any of these exams is lower than 4, this will be the course's final grade.
Delivering all the "Laboratory Reports" is mandatory to pass the course.
The continuous evaluation grade obtained throughout the course (Test/s and Laboratory Reports) will be kept.

BIBLIOGRAPHY AND RESOURCES

Basic References

J.D. Muñoz Frías, R. Palacios, "Fundamentos de programación utilizando el lenguaje C", Ed. Universidad Pontificia Comillas. Madrid, España. 2006. ISBN: 84-8468-184-1.

B.W. Kernighan, D.M. Ritchie, "The C Programming Language (2nd Edition)" Ed. Prentice-Hall, 1988. ISBN: 01-3110-362-8

J.L. Antonakos, K.C. Mansfield, "Application Programming in Structured C" Ed. PrenticeHall, 2002. ISBN: 01-3356-684-6

B.S. Gottfried, "Programación en C. Serie Schaum 2ª Edición revisada", Ed. McGraw- Hill, 2005. ISBN: 84-819-846-8