



IDENTIFYING DATA

Computer science: Computing for engineering

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|---------------------|--|-----------------|------|------------|
| Subject | Computer science: Computing for engineering | | | |
| Code | V12G363V01203 | | | |
| Study programme | Grado en Ingeniería en Tecnologías Industriales | | | |
| Descriptors | ECTS Credits | Choose | Year | Quadmester |
| | 6 | Basic education | 1st | 2nd |
| Teaching language | Spanish Galician English | | | |
| Department | | | | |
| Coordinator | Rodríguez Damian, María Sáez López, Juan | | | |
| Lecturers | Castro Rascado, Enrique Diéguez González, Luis Díez Sánchez, Ana Isabel Fernández Fernández, María Sila Ibáñez Paz, Regina López Fernández, Joaquín Pérez Cota, Manuel Rodríguez Damian, Amparo Rodríguez Damian, María Rodríguez Diéguez, Amador Sáez López, Juan | | | |
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| General description | They treat the following contents: Methods and basic algorithms of programming Programming of computers by means of a language of high level Architecture of computers Operating systems basic Concepts of databases | | | |

Training and Learning Results

| | |
|------|--|
| Code | |
| B3 | CG3 Knowledge of basic and technological subjects that enable students to learn new methods and theories, and to adapt to new situations. |
| B4 | CG4 Ability to solve problems through initiative, decision-making, creativity, critical reasoning, and to communicate and transmit knowledge, skills and abilities in the field of industrial engineering. |
| C3 | CE3 Basic knowledge on the use and programming of computers, operating systems, databases and software applications in engineering. |
| D1 | CT1 Analysis and synthesis. |
| D2 | CT2 Problem solving. |
| D5 | CT5 Information Management. |
| D6 | CT6 Application of computer science in the field of study. |
| D7 | CT7 Ability to organize and plan. |
| D17 | CT17 Working as a team. |

Expected results from this subject

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|------------------------------------|-------------------------------|
| Expected results from this subject | Training and Learning Results |
|------------------------------------|-------------------------------|

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|--|----------|----|-----------------------|
| Computer and operating system skills. | B3 | C3 | D5 D6 D7 |
| Basic understanding of how computers work | B3 | C3 | D1 D5 |
| Skills regarding the use of computer tools for engineering | B3 | C3 | D5 D6 D7 D17 |
| Database fundamentals | B3 | C3 | D1 D5 D6 D7 |
| Capability to implement simple algorithms using a programming language | B3 B4 | C3 | D2 D7 D17 |
| Structured and modular programming fundamentals | B3 B4 | C3 | D2 D5 D17 |

Contents

| Topic | |
|---|---|
| Concepts and basic techniques of programming applied to the engineering | Paradigms of programming Programming structured Programming languages Python features |
| Foundations of Python | Types of variables data and operators Comments Functions and standard Modules. Import and use of modules. Input-Output and control of errors |
| Structures of control | Decision if-else Iterative: while Boolean algebra |
| Sequences and iterative | Working with sequences: lists, tuples and string Types of data mutable and no mutable Concepts of reference and value Indexes of the sequences Cycle for- in Operators and sequences Functions and methods of sequences |
| Lists and List of lists | Operators and methods Characteristics of the lists Working with lists Indexes and iterate lists |
| Functions and own Modules | Definition and creation of functions Types of parameters and return values Concepts of value and reference in the parameters Scope of the variables Creation and invocation of modules |
| Persistence | Files, definitions and characteristics Basic operations with the files |
| Graphic interface | Creation of windows and widgets Manipulation of graphic elements Utilisation of variable control |
| Basic concepts of Computing | Computer Architecture Components: hardware, software Operating systems Databases |

Planning

| | Class hours | Hours outside the classroom | Total hours |
|-------------------------|-------------|-----------------------------|-------------|
| Introductory activities | 1 | 1 | 2 |
| Practices through ICT | 22 | 24 | 46 |
| Problem solving | 11 | 18 | 29 |

| | | | |
|---------------------------------|----|----|----|
| Previous studies | 1 | 5 | 6 |
| Autonomous problem solving | 6 | 20 | 26 |
| Lecturing | 10 | 0 | 10 |
| Objective questions exam | 4 | 7 | 11 |
| Problem and/or exercise solving | 8 | 12 | 20 |

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

| Methodologies | |
|----------------------------|---|
| | Description |
| Introductory activities | Activities directed to take contact, gather information on the students, creation of groups, tasks of organisation, as well as present the subject. |
| Practices through ICT | Activities of application of the knowledges to concrete situations and of acquisition of basic skills and process related with the matter object of study. They develop in special spaces with equipment facilitated by the School, and expects that each student have his own laptop or the facilitated by the School. |
| Problem solving | Analysis of a fact, problem or real event with the purpose to know it, interpret it, resolve it, generate hypothesis, contrast data, complete knowledges, diagnose it and train in alternative procedures of solution. |
| Previous studies | Reading and understanding by part of the student of some subjects or parts of subjects to deepen in the knowledge of the same in class. |
| Autonomous problem solving | Resolution by part of the student of the different type of problems posed, being able to identify the efficiency of each method of resolution proposed. |
| Lecturing | Exhibition by part of the professor of the contents on the matter object of study, theoretical bases and/or guidelines of a work, exercise or project to develop by the student. |

| Personalized assistance | |
|-------------------------|--|
| Methodologies | Description |
| Problem solving | They will resolve the doubts posed by the students. Teachers' tutoring in the agreed format. |
| Practices through ICT | Attention in the laboratory to the doubts that present or will indicate him the way to be followed so that the person find the solution. Teachers' tutoring in the schedule and format stipulated. |

| Assessment | | | |
|---------------------------------|--|---------------|-------------------------------|
| | Description | Qualification | Training and Learning Results |
| Practices through ICT | Group of proofs that include the solution of problems, exercises of practical type, and activities to resolve. | 70 | |
| Objective questions exam | Proofs for the evaluation of the competitions purchased that include questions with different alternative of answer (true/false, multiple election, ...) | 15 | B3 C3 D5 |
| Problem and/or exercise solving | Resolution of practical exercises | 15 | |

Other comments on the Evaluation

Ethical commitment:

Students are expected to behave ethically. If unethical behaviour is detected (copying, plagiarism, use of unauthorized electronic devices and others), then it will be considered that the student does not meet the minimum requirements to pass the course. In this case, the final grade for the current academic year will be failed (0.0).

In addition to the ethical commitment, the following is underlined:

In the first place, a person registered in the course is by default subject to the continuous assessment system; if the student does not want to be in this system, the he/she must expressly renounce to it within the established deadlines.

CONTINUOUS ASSESSMENT OPERATION

In the present course, the continuous assessment will collect all the evidence of learning from the person enrolled and will be grouped into three assessments. The first two will take place preferably in the laboratories: Test 1 and Test 2. The third evaluation may be written: Test 3. If the student does not renounce to the continuous evaluation system, tests that are not attended will be considered as qualified as zero (0.0). A minimum score of 30% out of 10 (3.0 points) must be obtained in the

last two evaluations: Test 2 and Test 3, in order to be eligible to have the final average calculated. If this requirement is not met and the final average is equal to or greater than 5, the final grade will be 4:

$$\text{Test 1} * 0.3 + (\text{Test 2} \geq 3) * 0.4 + (\text{Test 3} \geq 3) * 0.3 \geq 5$$

A student is considered passed if he/she obtains a five or more in compliance with all the requirements.

First call (May/June):

The following must be met to pass the subject under continuous assessment:

$$\text{Test 1} * 0.3 + (\text{Test 2} \geq 3) * 0.4 + (\text{Test 3} \geq 3) * 0.3 \geq 5$$

Once the first evaluation: Test 1, has been carried out, the person enrolled may request to abandon the continuous evaluation system (within the period and by the means established by the teaching staff). In this way, the person enrolled will be able to follow the non-continuous assessment system.

Second call (June/July):

If a person does not reach the passing level in the first exam (May/June) but has passed the minimum mark in the second exam: Test 2, in the second call (June/July) he/she can choose to keep the grades of the first two tests, and take a 4-points exam, or take a 100% exam in the subject (10 points). If the person takes the 3-points test, he/she will be asked for a minimum score of 30% out of 10 (3.0 points) in order to calculate the final grade. If this requirement is not met and the final average is equal to or greater than 5, the final grade will be 4.

NON-CONTINUOUS EVALUATION OPERATION

An exam that allows students to obtain 100% of the grade. The exam may be divided into sections, minimums can be required.

First call (May/June):

Registered students who have expressly renounced to the continuous assessment system may take the May/June exam (on the date and at the time proposed by the School) and take an exam that allows them to obtain 100% of the grade. This exam is not open to those who have failed the continuous assessment.

Second call (June/July):

An exam will be proposed to evaluate 100% of the subject, for those who have not achieved the minimum mark in the first call.

The version of the guide was made in Spanish. For any doubt or contradiction, the Spanish guide will be mandatory.

Sources of information

Basic Bibliography

Eric Matthes, **Python Crash Course, 3rd Edition: A Hands-On, Project-Based Introduction to Programming**, 3, No Starch Press, 2022

Silvia Guardati Buemo y Osvaldo Cairó Battistutti, **De cero al infinito. Aprende a programar en Python**, Cairó, 2020

Juan Diego Pérez Villa, **Introducción a la informática. Guía visual**, Anaya Multimedia, 2022

Complementary Bibliography

Jane Holcombe y Charles Holcombe, **ISE Survey of Operating Systems**, 7, McGraw Hill, 2022

Antonio Postigo Palacios, **Bases de datos**, Ediciones Paraninfo, 2021

Recommendations
