COURSE DATA

Data Subject	
Code	34751
Name	Informatics
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1401 - Degree in Chemical Engineering	School of Engineering	1	First term

Subject-matter

Degree	Subject-matter	Character
1401 - Degree in Chemical Engineering	6 - Information technology	Basic Training

Coordination

Name	Department
CASAS YRURZUM, SERGIO	240 - Computer Science

SUMMARY

This course tries to show the basics of what a computer is, what are its basic components, potential uses and limitations.

It will introduce students to the understanding and management of the operating system as well as the description and use of the network as a key part in communicating information between computers.

It will also provide a basic knowledge of different tools, as well as a brief introduction to the concept of database.

It will also try to provide a sufficient knowledge of algorithm design using structured programming, as well as fundamental data structures.

Regarding the practical part of this course, the student will try to consolidate the knowledge studied in the theoretical part of the subject, both in the knowledge of the computer and the basic tools for its use, and acquire software development skills in a language of structured programming of general purpose.

The general objectives of the course are:

Introduce students to a basic knowledge about the structure of a computer, both at the hardware (processor, memory, etc.) and the software level (operating system, application programs, etc.).

- Introduce students to the use of the network as a tool for information sharing, access and use of remote computers.
- Provide a generic view of what databases are and what are they used for, as well as some practical examples of use.
- Introduce students to the procedural programming methodology by introducing the concept of programming language and the concept of algorithm, as well as different methods of problem solving (refinement, top-down resolution, etc.). Introduce students to data types, variables, constants, control structures and the data need to develop programs.

The theory classes will be taught in Spanish and the practical classes and laboratory as they appear in the web of the degree.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

OUTCOMES

1401 - Degree in Chemical Engineering

- G3 - Knowledge of basic and technological subjects that allows students to learn new methods and theories and provides them with versatility to adapt to new situations.
- G10 - Ability to work in a multilingual and multidisciplinary environment.
- B3 - Basic knowledge of the use and programming of computers, operating systems, databases and software with engineering applications.

LEARNING OUTCOMES

Learning Outcomes

• Ability to describe the parts that make up a computer and explain their function (B3).

• Ability to list various peripheral devices explaining its function (B3).

• Ability to perform basic operations on files (G3, B3).

• Ability to perform basic administration tasks in an operating system (G3, B3).

• Ability to edit technical documents, use spreadsheets, create presentations and small databases using application programs office (G3, G10, B3).

• Ability to use network application programs to visit websites, find content on the internet, publishing content on web, etc (G3, G10, B3).

• Ability to describe algorithmic solutions to problems (B3).

• Ability to use a programming language to describe the algorithm that solves a problem (B3).

• Describe the basic data types, numeric and nonnumeric (B3).

• Design simple computer program with one or more loops (B3).

• Design simple computer programs structured by functions (B3).

• Design simple computer programs using conditional structures (B3).

• Document programs properly constructed (B3).

Skills to Acquire

The student should be able to:

• Have a basic knowledge about the internal structure of a computer in both the physical (CPU, memory, …) and the logical level (operating system, programs, ...), so that they can understand the internal operation of the computer.

• Know and use basic computer tools at operating system level.

• Use the basic tools for managing files on a network.

• Understand the operation of a database and perform simple tasks on it.

• Analyze problems, design and develop algorithms to solve them using the computer.

• Understand data types, variables, constants, control structures and data structures that are used in procedural programming languages to develop programs.

• Use the paradigm of procedural programming to solve problems using a computer. Learn to code simple algorithms in a structured programming language.

In addition to the specific objectives mentioned above, the course will encourage the development of several **social and technical skills**, among which include:

- Modeling and problem solving: knowing how to solve problems, being able to identify the essential elements of a situation and make the approximations required to reduce the problem to a manageable level.
- Problem solving and computer skills.
- Oral and written communications abilities.
- Working groups: knowing how to cooperate, interact and divide the work with other people to solve problems.

DESCRIPTION OF CONTENTS

1. Introduction

Concept of computer: Basic concepts. Internal structure of the computer.
Software: Operating system. Utilities.
Information management.
Computer programs for engineers applications.

2. Computer networks

Introduction and basic concepts.
Utilities to share information.

3. PROGRAMMING IN HIGH-LEVEL LANGUAGES

Algorithm
Languages and programming paradigms.
Characteristics of high level programming: Variables and constants.
Simple Data Types.
Phases in conducting a program: Analysis of the problem. Algorithm design and programming.

4. STRUCTURED PROGRAMMING

Structured programming.
Design of structured programms.
Control Structures: Sequential structure. Conditional structure. Iterative structure.

5. MODULAR PROGRAMMING

Module definition.
Modular programming.
Definition subprogrammes: Functions.
Parameters of a subprogram.
Scope of identifiers.
Recursion.

6. Structured Data Types

Vectors/arrays, matrices, strings and records.

7. FILES

Basics concepts of files.
Access types.
Logical and physical files.
Text files.
Processing files.
Data bases.

8. COMPUTER LAB

Laboratory practices will be held:
1 .- Network and internet and programming environment
2 .- Input, output and data types
3 .- Selective Structures
4 .- Repetitive structures
5 .- Modular programming
6 .- Vectors and matrices
7 .- Strings and Records
8 .- Files

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Laboratory practices	20,00	100
Classroom practices	10,00	100
Development of individual work	15,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	27,00	0
Preparation of practical classes and problem	38,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

In the face-to-face (in class) theoretical activities, the topics of the subject will be developed, providing a global and integrating vision, analyzing in greater detail the key and most complex aspects, encouraging, at all times, the participation of the students. These activities are complemented by practical activities with the aim of applying the basic concepts and expanding them with the knowledge and experience that are acquired during the realization of the proposed works. They comprise the following types of face-to-face activities:

• Problem-based classes and issues in the classroom (G3, G10, B3).

• Regular discussion and resolution of problems and exercises that the students have previously worked (G3, G10, B3).

• Laboratory classes (G10, B3).

• Conducting individual evaluation questionnaires in the classroom with the presence of teachers (B3).

In addition to classroom activities, students must perform personal tasks (outside the classroom) on (G3, G10, B3): monographs, literature search, issues and problems as well as the preparation of classes and exams (study). These tasks will be performed primarily in an individual basis, in order to enhance autonomous self-work, but will additionally include work requiring the participation of small groups of students (2-4) to build the capacity for integration into working groups (G10).

The e-learning (virtual classroom) of the University of Valencia will be used as a means of communication with students. Through this platform students will have access to course materials used in class and they will also solve problems and exercises (G3, G10, B3).

EVALUATION

The evaluation of the course is conducted with:

- A continuous assessment based on the participation and the degree of involvement in the teaching-learning process, taking into account the regular attendance to the onsite activities and the resolution of the issues and problems proposed. This part is not recoverable. (G3, G10, B3) (N_Continuous).
- The assessment of practical activities based on the achievement of objectives in the laboratory sessions, and the preparation of papers/reports/exercises. Occasionally oral presentations can be requested (individually and/or in a group) to assess the ability to prepare documents and transmit knowledge. For this section, a final programming project may also be carried out. If this project is carried out, an oral defense may be required, individually, once delivered. This part is not recoverable. (G3, G10, B3) (N_LabPractices).
- Individual tests, consisting of exams, or knowledge tests, which will consist of both theoretical-practical questions and problems. This section will be divided into a final exam and a control test. The final exam will provide 70% of the grade of this evaluation item, while the control test will provide the other 30%. In the event that the control test cannot be carried out for reasons related to the calendar or for other reasons, the grade for this part will be that of the final exam. (B3) (N_ Exams).

First evaluation call:

In this call, the final grade will be calculated as:

Final Grade = 15% N_Continuous + 35% N_Lab_Practices + 50% N_ Exams

It will be necessary to obtain at least a 4.5 out of 10 in each of the last two parts (N_LabPractices and N_ Exams) to be able to get a final weighted average grade.

Second evaluation call:

Final Grade = 10% N_Continuous + 20% N_LabPractices + 70% N_ Exams

In this case, the concept N_ Exams will only include the final exam and it will have 70% of the weight of the final grade, while the other two concepts (N_Continuous and N_LabPractices) continue to be valuable, but with a lower weight over the final grade. Thus, a student who only attends the final exam can obtain a maximum of 70% of the final grade.

In the second evaluation call, in the parts N_Continous and N_LabPractices, the grades obtained in the first evaluation call will be kept for this second evaluation call.

Early evaluation call

In order to request an extraordinary early evaluation call, students must have previously completed the course and have obtained a minimum grade of 5 in the evaluation of practical laboratory activities (N_LabPractices).

Plagiarism

Any plagiarism/copy in any exam, practice, work or activity of the course will automatically imply obtaining a final grade of 0 in the corresponding call for all the students involved in the copy, without distinction of origin or destination of the copy and without prejudice to the corresponding administrative files that may be derived from such events.

In any case, the evaluation system will be governed by the provisions of the Evaluation and Qualification Regulation of the University of Valencia for degrees and masters (https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?accion=inicio&idEdictoSelecctado= 5639).

REFERENCES

Basic

- Apuntes de la asignatura
- [G. Beekman (2005)]. Introducción a la informática [Recurs electrònic]. Pearson. Prentice Hall 2005. Ingebook Ebooks.
- [H.M. Deitel, P.J. Deitel (2009)]. C++ Cómo programar. [Recurs electrònic]. Pearson. Prentice Hall. 2009. Ingebook Ebooks
- [L. Joyanes (2006)]. Programación en C++: Algoritmos, estructuras de datos y objetos [Recurs electrònic]. MacGraw Hill. 2006. Ingebook Ebooks

Additional

- [H.M. Deitel, P.J. Deitel (2014)]. C++ How to Program (Prentice-Hall). Disponible en catálogo electrónico de la UV.
- [L. Joyanes (2006)]. Programación en C++: Algoritmos, estructuras de datos y objetos (MacGraw Hill). Disponible en catálogo electrónico de la UV.
- [L. Joyanes, I. Zahonero (2005)]. Programación en C: Metodología, algoritmos y estructuras de datos (MacGraw Hill). Disponible en catálogo electrónico de la UV.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

Contents

The contents initially described in the Teaching Guide remain unchanged.

Volume of work and temporary planning of teaching

Regarding the workload:

The different activities described in the Teaching Guide are kept with the planned dedication.

Regarding the teaching schedule:

The course material, provided to follow theory/practical lessons, allows to continue with the teaching schedule both in days and in hours, both if the teaching is finally performed in the classroom or not.

Teaching methodology

In theory and practical lessons, there will be the maximum possible attendance, always respecting the sanitary restrictions that limit the capacity of the classrooms to 50% of their usual occupation. Depending on the capacity of the classroom and the number of students enrolled, it may be necessary to distribute the students into two groups. If this situation arises, each group will attend theory and practical sessions with physical presence in the classroom by rotating shifts, thus ensuring compliance with the criteria for occupying spaces. The rotation system will be established once the actual enrollment data is known, guaranteeing, in any case, that the attendance percentage of all the students enrolled in the subject is the same. For practical sessions and theory sessions that are not face-to-face, the goal will be to lean towards a synchronous online teaching model, as long as compatibility with other scheduled activities allows doing so. Online teaching will be carried out by synchronous videoconference respecting the schedule, or, if not possible, by means of asynchronous lessons.

Regarding laboratory practices, the sessions planned in the teaching schedule will be face-to-face, provided that the sanitary conditions allow doing so.

Once the actual enrollment data is available and the availability of spaces is known, the Academic Committee of the Degree will approve the Teaching Model of the Degree and its adaptation to each subject, establishing in that model the specific conditions in which the subject's teaching will be developed.

If there is a closure or limitation of use of the facilities for sanitary reasons that totally or partially affects the classes of the subject, these will be replaced by non-face-to-face sessions following the established schedules. The entire subject can be carried out on-line, because the use of specific material that can only be used in the ETSE facilities is not required. Therefore, the change from face-to-face to non-face-to-face on-line teaching should be able to occur quickly and in an orderly manner.

Evaluation

The evaluation system described in the Teaching Guide of the subject, in which the different evaluable activities - as well as their contribution to the final grade of the subject - have been specified, is kept unchanged.

If there is a closure or limitation of use of the facilities for sanitary reasons that affect the development of any face-to-face evaluable activity of the subject, it will be replaced by a test of a similar nature that will be carried out in on-line mode using the computer tools licensed by the Universitat de València. In the case of control tests and written exams, an oral review may be added by means of individual synchronous videoconference. The contribution of each evaluable activity to the final grade for the course will remain

unchanged, as established in this guide.

Bibliography

The bibliography recommended in the Teaching Guide is kept as is, since it is accessible and is complemented with notes, slides and problems uploaded to the Virtual Classroom as subject material.