COURSE DATA

Data Subject	
Code	44775
Name	Computer systems and networks
Cycle	Master's degree
ECTS Credits	4.5
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2231 - M.D. in Biomedical Engineering	Faculty of Medicine and Odontology	0	Second term

Subject-matter

Degree	Subject-matter	Character
2231 - M.D. in Biomedical Engineering	15 - Bridging courses	Optional

Coordination

Name	Department
DOMINGO ESTEVE, JUAN DE MATA	240 - Computer Science
DURA MARTINEZ, ESTHER	240 - Computer Science

SUMMARY

The subject of computer systems and networks aims to provide the necessary knowledge base for people with previous knowledge about computers, applications and programming, basically typical users from scientific disciplines or engineering. Some of the specific computer skills that a biomedical engineer must possess will begin to be introduced here, with the aim of releasing the subjects of higher level of introductory aspects, which may allow to focus more their contents to make the graduates reach the required skills In the time available. This leads to an organizational problem, given the variety of backgrounds of the students: some of them will come from engineering, in which aspects of general introduction to computers and computing will have been sufficiently addressed, while in those coming from degrees in the health area these aspects can not necessarily be assumed. On the other hand, there are specific aspects focused on equipping the student with the skills and abilities of this master.

It is also necessary to indicate as part of this introduction what aspects of general informatics are important pieces in the training of these students. Apart from, of course, introductory aspects (concepts of computer, peripherals, network, software, hardware, operating systems, etc.) students will use in their professional life computer science in connection with:

- The daily use of the computer as a basic tool of work, with the usual applications, and the search of information on the Internet or in specific repositories.
- The manipulation of important volumes of data related either to health management (economic aspects of management, etc.), or to the onw medical information of individual patients (eg results of diagnostic tests in digital format) or aggregated information (Overall costs, efficiency of health organizations, epidemiological analyzes, etc.).
- The acquisition, storage and processing of data generated by devices of increasing complexity (biomedical signals and images), understanding the basic functions of the computers integrated in such devices, and their interconnection with others, as well as data from genetic sequencing for use in Bioinformatics.

Providing students, regardless of their source, with the skills to understand and manage, at least at the elementary level, these three uses would require knowledge of very different computer aspects: use of common applications, use of search engines, use of databases, data mining algorithms, distributed computing, security and privacy of information, integration of heterogeneous computer systems, connection and configuration of acquisition peripherals, etc. Given the formidable task, taking into account the available time, we will choose the most reasonable solution that is possible: use part of the subject as a general introduction and another part as specific introductions to the most important previous knowledge, in which each student according to his orientation will ellaborate later, knowing at least of the existence and uses of the main techniques.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

The requirement are specificed in the verification document of the Biomedical Engineering Master, point 4.2

OUTCOMES

LEARNING OUTCOMES

For those students coming from degrees in the biosanitary area, it is utopian to pretend that in a course of these characteristics they know how to program with minimal fluency in common structured languages, such as C and C ++. Since, on the other hand, only a few of them (a minority) will need to do so in their normal working environment, it has been preferred to give them the competence to use advanced common software (including their installation and configuration) as well as to handle query languages in Databases (introduction to SQL) instead of using the time of the subject in data structures or algorithms. With this aim, at the end of the course a student even without previous knowledge, should be able to:

- Choose the appropriate computer system for the application that is requested, including the appropriate hardware and software. It must be able to meet the restrictions of computational capacity and economic cost, which implies paying special attention to the alternatives of free software that may exist.
- Install and configure an operating system or similar, including basic security measures (firewalls, user accounts, etc).
- Install basic hardware (eg signal or image acquisition boards) and associated software as well as configure them for use by other users.
- Know the basic tools of design, creation and query of a database, and how to retrieve the desired information through queries and summarize it in reports.
- Ability in the search, selection and evaluation of information, using both the relevant information available on the network and the traditional bibliography.
- Ability to solve problems whose solution does not derive from the application of a standardized procedure.
- Ability to get the right information to deal with new scientific problems that arise.
- Ability of the person to plan and conduct their own learning.
- Ease of communication of information, both orally and in writing.
- Ability to work in groups when facing problematic situations in a collective manner.

DESCRIPTION OF CONTENTS

1. Introduction to computers

Basic fundamentals: concepts of hardware and software, functional units of the computer, physical characteristics of computer systems, characteristics of storage media.

2. Operating Systems

Concept and uses. Layers and levels. Interaction with hardware. Users, groups and permissions. System Services. Daemons. Interaction with the shell.

3. Databases

Concept and types. Database models. Relational model. Relational algebra. Representation as tables. Introduction to SQL.

4. Networks and security

Local and global networks. Exchange and Internet Protocols. Client-server model. Network services. Computing and distributed storage.

5. Information representation and interchange

Representation of information on the Internet. Markup languages (XHTML, XML). Introduction to information systems: hospital information systems and neutral formats of data exchange.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Computer classroom practice	15,00	100
Attendance at events and external activities	6,00	0
Development of group work	15,00	0
Development of individual work	15,00	0
Study and independent work	15,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	4,00	0
Preparation of practical classes and problem	4,00	0
TOTAL	**124,00**	

TEACHING METHODOLOGY

The master class and class of problems will be combined.
However, the master class should not be understood in the classic way of giving a complete and detailed presentation of a topic by the teacher: the content of such class, in the form of notes and / or book chapters, as well as the transparencies that are used, have been previously delivered to the students, or made available in the virtual platform, and and they will have to have read them as a prior preparation. In this way it should be sufficient to briefly expose the subject, emphasizing only those aspects of difficult comprehension and answering the questions of the students.
With regard to the practical assignments, short works such as installation and configuration of a program in a system, creation of web pages, small sample databases, etc. will be preferred.
Each student will be provided with a Linux distribution installed as a virtual machine to run on their own computers or in the classroom, including if needed a USB disk ito contain the virtual machine, that students will return at the end of the course.

EVALUATION

There will be four ways of evaluation:
1) Marking of the works, in principle in the form of text, software, etc. that the students deliver, with the possibility of calling to tutorials for a maximum of half an hour per person to some students so that they explain the writing or the instructor can verify their authorship.
2) Continuous evaluation in the classes of problems, asking the delivery of the problems for the day or reqquesting some of the students to solve one of them on the blackboard.
3) An exam of test type or of brief answers type at the middle of the agenda, with the possibility of eliminating part of the topics.
4) A written exam with some questions about the theory and one or more problems (exercises with a level of difficulty comparable to those solved in class).

The overall rating will result from the weighted average of the results of these four modes.

It is considered that a student has assisted to all the compulsory sessions if he or she attends a minium of the 80% of the laboratory sessions. The student also has to justify why he/she could not attend as long as there is a major reason. Those student who are working and can not attend the practical sessions should contact the lecturer before the beginning of the first session. The results of these activities must be submitted to the lecturer in charge of the group during the course and in the terms established by the lecturer. Students are expected to do/prepare some of these activities at home.

The evaluation will be conducted in accordance Qualifications University of Valencia. At the time of writing this guide, the current legislation was the one approved by the Governing Council of the UVEG of January 27, 2004, adjusted as provided for that purpose by the Royal Decrees 1044/2003 and 1125 / 2003. It states basically that the marks will be numbered from 0 to 10 with a decimal expression with the following rating scale :

From 0 to 4,9: “Fail”(D,E, F)

From 5 to 6,9: “Pass” (C)

From 7 to 8,9: “Notable”(B)

From 9 to 10: “Excellent” (A, A+)

Any copy among students detected in the continuous assessment (C), in the final test (E) or in the laboratory assessment (P) involves loosing the matriculation of first and second call in the current course.

Regarding fraudulent activities:

-The lecturer may expel students form the classroom while they are doing an exam if:

1) They don’t guarantee the authencity and privacy of the exercise.

2) They borrow the identity of another student

3) They have the mobile phone or any other unauthorized electronic device or document

-The lecturer can stay with the evidence involved in incidents occurred as they are doing an exam and notify by a written stament to the head of studies of the center.

The lecturer can qualify with a “zero” mark an exam when:

1) There are indications of fraudulent performance in the exam or part of it.

2) They have the mobile phone or any other unauthorized electronic device or document

In addition to all these measures, the lecturer may initiate disciplinary proceedings against the student.

REFERENCES

Basic

- Referencia b1: Apuntes de Adquisición y tratamiento de Datos, E.V. Bonet, http://informatica.uv.es/estguia/ATD/

  Referencia b2: Operating Systems Concepts (4ª Edición), A. Silberschatz, P. Galvin, Ed. Addison-Wesley, 1994.

  Referencia b3: "Fundamentos de Sistemas de Bases de Datos", R. A. Elmasri, S. B. Navathe, 3º Edición, Addison-Wesley.

Additional

- Referencia c1: Apuntes Bases de Datos, UV
  Referencia c2: "SQL: Para usuarios y programadores", J. Benavides Abajo, J.M. Olaizola Bartolomé, E. Rivero Cornelio. Ed. Paraninfo.
  Referencia c3: A.S. Tanenbaum: "Redes de Computadoras (4ª edición)". Ed. Prentice Hall.