Course guide
820031 - SICSB - Information Systems and Communications for Health Services

Last modified: 27/10/2022

Unit in charge: Barcelona East School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2022 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Jordi Solà Soler

Others: Primer quadrimestre:
PEDRO GOMIS ROMAN - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15
FLAVIO PALMIERI - Grup: M11, Grup: M12, Grup: M13
JORDI SOLA SOLER - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15

PRIOR SKILLS

Basic knowledge of computer programming

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. Identify, understand and apply the principles of information and communication systems to healthcare.

Transversal:
1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

TEACHING METHODOLOGY

The course has two hours per week of theory (large group), 1 hour weekly of problems (large group) and each two weeks two lab hours (small group). In theory class, it will be combined theoretical expositions and exhibitions examples. Problem classes will be participatory and these will be focused on problem solving. In the lab, students must follow the conditions outlined by the teacher. In addition, it is considered hours of self-directed learning focused on a project, in which each working group must work the generic competence making an efficient use of information resources.

LEARNING OBJECTIVES OF THE SUBJECT

1. Understanding advanced concepts of computer science and programming. 2. Ability to analyze, design and construction of databases in the health field. 3. Being able to design and configure a data communication system. 4. Ability to solve problems in the field of biomedical engineering using techniques which involve communication systems and databases. 5. Identifying the basic elements of a local area network.

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	30.00
Self study	90,0	60.00
Hours small group	15,0	10.00

Total learning time: 150 h

CONTENTS

(ENG) T1: Introduction to medical informatics

Description:
Introduction to medical informatics. Basic concepts of medical informatics. Information systems in the healthcare environment. Fundamentals of clinical history.

Specific objectives:
-Knowing the informational requeriments in the health sector and undestanding how the medical informatics provides solutions.
-Knowing the basic concepts of medical informatics

Related activities:
Theory lessons based on examples.

Full-or-part-time: 6h
Theory classes: 2h
Self study : 4h

(ENG) T2: Design and management of clinical databases

Description:
Modeling databases: Entity / Relation diagrams. Structured Query Language. Applications in healthcare environment.

Specific objectives:
-Defining what is a database, and its application in the context of medical informatics.
-Applying the design methodology of databases and to be able to make a critical interpretation of solutions in healthcare environment.
-Knowing the main sencences of the structured query language and to be able to use it to obtain information from clinical databases.

Related activities:
Theory lessons based on examples. Problem-solving sessions and lab work. Application project.

Full-or-part-time: 48h
Theory classes: 15h
Laboratory classes: 8h
Self study : 25h

(ENG) T4: Digital communications and computer networks

Description:
Fundamentals of digital communications. Communication protocols. Local area networks. Interconnection elements.

Specific objectives:
-To be able to identify the basic elements of a computer network.
-To be able to analyze and design a local area network.
-Knowing to configure the basic intercommunication elements.

Related activities:
Theory lessons, problem-solving sessions and lab work. Applied project.

Full-or-part-time: 48h
Theory classes: 16h
Laboratory classes: 7h
Self study : 25h

(ENG) T3: Applied project

Description:
Set out an applied project. Required documentation. Work in group. Design and implementation of a an information and communication system in the healthcare environment.

Specific objectives:
- To be able to design and configure an information and communication system.
- To learn how to solve biomedical engineering problems that involve databases and communication systems.

Related activities:
Work in group. Project presentation.

Full-or-part-time: 48h
Theory classes: 12h
Self study : 36h

GRADING SYSTEM

Final grade = 0.5 * Exams + 0.1 * Problems + 0.2 * Lab + 0.2 * Other
where Exams is the average of two partial exams (P1 and P2), Problems scores the proposed activities, and the laboratory includes active learning activities for which the students will make preliminary studies and follow-up assessment reports including the obained results. Other qualifications include a project where generic competence will be developed. The evaluation of the project will follow the following scale:

-The rating of the generic competence of information resources: 25%.
-Quality of content: 75%.

Students who don't pass the subject during the course may do a re-assessment exam (RA). This exam will contain conceptual questions and problems about the whole contents of the subject. It will allow to make up 50% of the final mark, according to the formula max{0.25P1+0.25P2, 0.5RA}.
The students will be able to access the re-assessment test that meets the requirements set by the EEBE in its Assessment and Permanence Regulations (https://eebe.upc.edu/ca/estudis/normatives-academiques/documents/eebe-normativa-avaluacio-i-permanencia-18-19-aprovat-je-2018-06-13.pdf)

EXAMINATION RULES.

- The practices are mandatory.
- Repeater students will not receive recognition for any part of the course.
- If some deliverable or some activity is not performed, this will be considered as not scored.

BIBLIOGRAPHY

Basic:

- Pons, Olga [et al.]. Introducción a las bases de datos: el modelo relacional. Madrid: Paraninfo, 2005. ISBN 8497323963.
- Tanenbaum, Andrew S.; Wetherall, David J.. Computer networks. 5th ed. Harlow: Pearson Education, cop. 2013. ISBN 9781292024226.
- Cerdà Alabern, Llorenç. Xarxes de computadors : conceptes bàsics [on line]. Barcelona: Edicions UPC, 2007 [Consultation: 11/06/2020]. Available on: http://hdl.handle.net/2099.3/36267. ISBN 8483018972.

Complementary:

- Biomedical informatics : computer applications in health care and biomedicine. 3rd ed. New York: Springer, cop. 2006. ISBN 0387289860.
- Crisp, John. Introduction to fiber optics [on line]. 3rd ed. Oxford: Newnes, 2005 [Consultation: 11/06/2020]. Available on: http://www.sciencedirect.com/science/book/9780750667562. ISBN 9780750667562.
- Harrington, Jan L.. Relational database design and implementation clearly explained [en línia] [on line]. 3rd ed. Boston: Morgan Kaufmann/Elsevier, 2009 [Consultation: 11/06/2020]. Available on: http://www.sciencedirect.com/science/book/9780123747303. ISBN 9780123747303.
- Silberschatz, A. ... [et al.]. Fundamentos de bases de datos [on line]. 5a ed. Madrid [etc.]: McGraw-Hill, cop. 2006 [Consultation: 11/06/2020]. Available on: http://site.ebrary.com/lib/upcatalunya/docDetail.action?docID=10505311. ISBN 9788448179267.