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

Last modified: 04/06/2026

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: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JORDI SOLA SOLER

Others: Primer quadrimestre:
FLAVIO PALMIERI - Grup: M11, Grup: M12, Grup: M13
DANIEL ROMERO PEREZ - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15
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 small group	15,0	10.00
Hours large group	45,0	30.00
Self study	90,0	60.00

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) T3: Digital communications and computer networks

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

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 how to configure basic intercommunication elements.
-To be able to identify communications security methods.

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

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

Final grade = 0.7 * Exams + 0.05 * Problems + 0.15 * Lab + 0.1 * 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 the 50% of the final mark related to the evaluation exams. To be able to access the re-assessment exam, students have to meet the requirements set by the EEBE in its Assessment and Permanence Regulations.

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.