

Academic Year: (2024 / 2025)

Review date: 24-04-2024

Department assigned to the subject: Bioengineering Department

Coordinating teacher: GUTIERREZ FERNANDEZ, ERIC

Type: Compulsory ECTS Credits : 9.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

The student should have completed the following subjects of the first year:

- Medical imaging technologies
- Analytical and monitoring systems
- Diagnosis and therapy systems

OBJECTIVES

This subject provides the student the necessary skills to be able to define a supervision plan for the installation and maintenance of electromedical infrastructures and systems, as well as the redesign of electromedical infrastructures; process and archive documentation and plan training actions for clinical and technical staff.

COMPETENCES THAT THE STUDENT ACQUIRES WITH THIS MATTER

CB6 Possess and understand knowledge that provides a base or opportunity to be original in the development and / or application of ideas

CB7 That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study

CB8 That students are able to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments

CB9 That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way

CB10 That students have the learning skills that allow them to continue studying in a way that will be largely autonomous.

CG3 Ability to design and carry out technological projects in the field of the application of engineering to medicine, as well as to analyze and interpret their results.

CG4 Ability to evaluate medical equipment and instrumentation in complex multidisciplinary environments, assessing the needs of different clinical users and offering objective measures for decision making.

CE1 Ability to evaluate algorithms and data processing techniques in complex multidisciplinary environments, assessing the needs of different clinical users and offering objective measures for decision making.

CE2 Ability to understand and use advanced statistical methods for conducting scientific studies, evaluation of equipment from the point of view of effectiveness, accreditation for medical use or study of comparative effects in patients.

CE3 Ability to apply advanced techniques of health technology management, both in technical and economic aspects, and including the acquisition and maintenance thereof.

CE8. Ability to use the appropriate innovation management tools and to assess the consequences of decisions on aspects of protection of intellectual and industrial property.

CE9 Ability to establish a dialogue with doctors to understand complex medical problems and the application of quantitative methods and engineering techniques to their solution.

CE11 Ability to plan, manage and supervise the installation and maintenance of non-implantable active medical devices in electromedicine systems and their associated facilities, under quality criteria, in

safety conditions and complying with current regulations.

CE13 Ability to plan, manage and supervise hospital infrastructures under quality criteria, in safety conditions and complying with current regulations.

LEARNING RESULTS THAT THE STUDENT ACQUIRES

In overcoming this subject, students should be able to:

- Elaborate installations, commissioning and maintenance plans of clinical electromedical infrastructures, systems and equipment taking into account the available technical documentation and current regulations.
- Prepare and archive the documentation corresponding to the management of the assembly, commissioning and maintenance of clinical electromedical infrastructures, systems and equipment, interpreting the established procedures.
- Provide basic information on the use and maintenance of clinical electromedical infrastructures, systems and equipment, as well as the security measures to be considered, to clinical and technical personnel, applying the most appropriate communication techniques.
- Redesign clinical electromedical infrastructures and systems, drawing up the location of the equipment and elements.
- Plan formative actions for both clinical and technical staff, checking their development and results.
- Apply teamwork strategies, assessing their effectiveness and efficiency to achieve the organization's objectives.

DESCRIPTION OF CONTENTS: PROGRAMME

The subject content is:

- Supervision and maintenance of electromedical systems and other engineering services in the hospital.
 - o Elaboration and management of maintenance programs.
 - o Medical equipment regulation.
- Design of electromedical infrastructures.
- Management of the clinical environment and human resources from the point of view of clinical engineering.

Objectives related to SDG: [Sustainability and climate change]: 16.5 hours divided into the following topics: Waste managing in hospitals (4.5 h), Hospital under construction (4.5 h), Regulation of medical devices: to market, installation and maintenance (4.5 h), Supervision, rethinking and execution of the hospital technology maintenance schedule (3h).

LEARNING ACTIVITIES AND METHODOLOGY

LEARNING ACTIVITIES

- Theoretical class
- Theoretical-practical class
- Practical seminars
- Tutorials
- Individual and team work

TEACHING METHODOLOGIES

- Exhibitions in the teacher's class with support of computer and audiovisual media, in which the main concepts of the subject are developed and the bibliography is provided to complement the students' learning.
- Resolution of practical cases, problems, etc. raised by the teacher individually or in groups.
- Exhibition and discussion in class, under the teacher's moderation of topics related to the content of the subject, as well as practical cases.
- Preparation of papers and reports individually or in groups.

ASSESSMENT SYSTEM

% end-of-term-examination:	50
% of continuous assessment (assignments, laboratory, practicals...):	50

Continuous assessment: 50%

- The continuous evaluation will represent 50% of the final score.

% end-of-term-examination: 50

% of continuous assessment (assignments, laboratory, practicals...): 50

- It will consist of carrying out individual assignments, problems and / or practical activities.

- Participation in class and Aula Global will be taken into account: includes participation during seminars, in the Aula Global forum, attitude in class, exercises in class (to be solved in groups or individually), or other activities.

Final exam: 50%

- The final exam will cover the entire syllabus and will represent 50% of the final score. The minimum score in the final exam to pass the course is 5.0 out of 10.0, regardless of the grade obtained in the continuous assessment.

Extraordinary exam:

- The final grade for students who attend the extraordinary call will be the highest scored taken from:

(1) 50% of the extraordinary exam and 50% of the continuous evaluation, achieved from the ordinary call.

(2) 100% of the extraordinary exam.

ACADEMIC CONDUCT:

Plagiarism, cheating or other acts of academic dishonesty will be not tolerated. Any infractions whatsoever will result in a failing grade.

BASIC BIBLIOGRAPHY

- UNE 20901 Seguridad de aparatos electromédicos para su utilización por personal administrativo, médico y de enfermería., UNE, 1995

- UNE-EN 13306 Mantenimiento. Terminología del mantenimiento., UNE, 2011

- UNE-EN 62353:2009 Equipos electromédicos. Ensayos recurrentes y ensayos después de reparación del equipo electromédico., UNE, 2009