

Academic Year: (2019 / 2020)

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Department assigned to the subject: Bioengineering and Aerospace Engineering Department

Coordinating teacher: SALINAS RODRIGUEZ, BEATRIZ

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

It is recommended to have passed the subjects Analytical and Monitoring Systems, Diagnostic and Therapy Systems and Medical Imaging Technologies of the 2nd semester of the 1st year.

OBJECTIVES

COMPETENCES ACQUIRED BY THE STUDENTS

CB6. To acquire comprehensive knowledge providing the opportunity to be creative in the development and/or application of ideas.

CB7. To be able to apply the acquired knowledge and their problem solving skills to the resolution of problems in novel or relatively unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

CB8. To be able to integrate knowledge and face the complexity of judgement making based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.

CB10. To possess the learning abilities that allow autonomous long-life learning.

CG3. To develop the ability to design and carry out technological projects in the field of the application of engineering to medicine, as well as the ability to analyze and interpret the obtained results.

CG4. To develop the 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.

CE3. Advanced knowledge of the technical and economic aspects of health technology management including their acquisition and their maintenance.

CE11. Ability to plan, manage and supervise the installation and maintenance of non-implantable active medical devices in electromedical systems and their associated facilities, meeting the quality criteria and safety conditions and complying with current regulations.

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

LEARNING RESULTS ACQUIRED BY THE STUDENTS

To pass the subject, students should be able to:

- Characterize the clinical electromedical service of a hospital/health institution and its relationship with the technical assistance services, recognizing the importance and repercussion of its proper management.

- Prepare a plan for the renewal and acquisition of new equipment of clinical electromedicine, analyzing the clinical needs of the center and the obsolescence and state of the available technology park.
- Define the technical characteristics of the new equipment to be acquired, considering the compatibility and connectivity with other facilities and infrastructures of the health center and the current technological innovation.
- Analyze the cost of the different purchase alternatives of equipment, breaking down the corresponding items and using reference prices.
- Determine the equipment to be acquired, identifying the most appropriate acquisition modality for the health center.
- Prepare and file the documentation corresponding to the management of the assembly, set up and maintenance of the clinical electromedicine facilities, systems and equipment, interpreting the established procedures.
- Rethink the clinical electromedicine facilities and systems tracing the location of the equipment and the different components. ¿
- Plan informative actions aimed at both clinical and technical staff following up their development and their result.

DESCRIPTION OF CONTENTS: PROGRAMME

This subject covers the study of the electromedical equipment of a health center from their planning and management perspective. The areas the course will cover are: monitoring and recording, critical care, laboratory, medical imaging, radiodiagnosis and radiotherapy, rehabilitation, functional tests, hemodialysis and water treatment and sterilization.

Upon completion of the course, the student would be able to plan the assembly and set up of the most relevant electromedical systems. He will also be able to plan the maintenance and supply programs. To do this, he will learn to draw up a plan for the renewal and acquisition of new electromedical systems and equipment, taking into account both the technical requirements and the cost of the different alternatives.

The content of the subject has been structured as follows:

PART 1. Introduction

- Life cycle of the electromedical equipment
- Evolution of the medical technology
- Basic IT

PART 2. Documentation and inventory

- Preparation and filing of technical documents
- Asset management and inventory

PART 3. Acquisition of new equipment

- Renovation plan and acquisition plan for new systems and equipment
- Analysis of the technical requirements of the equipment to be purchased
- Cost analysis of the equipment to be acquired
- Determination of the equipment. Analysis of the acquisition method.

LEARNING ACTIVITIES AND METHODOLOGY

The teaching methodology will be mainly based on theoretical classes, seminars and practical sessions.

Due to the large number of topics covered and their multidisciplinary nature, it is very convenient for the student to read the documentation assigned before the classes and when needed, supplement it with additional information obtained through their personal work.

The teaching methodologies will be:

- MD1. Lectures given by the teacher with computer and audiovisual media support, in which the main concepts of the subject are developed. Bibliography is provided to complement the students¿ learning.

- MD2. Critical reading of texts recommended by the teacher: Press articles, reports, manuals and/or academic articles, either for further discussion in class, or to expand and consolidate the knowledge of the subject.
- MD3. Resolution of practical cases, problems, etc raised by the teacher either working individually or in teams.
- MD4. Presentation and discussion in class of issues related with the content of the subject and well as practical cases. The professor acts as a moderator.
- MD5. Preparation of practical work and reports either individually or working in groups.

Development and justification:

- Theoretical academic sessions: as a means of offering a general and systematic overview of the topics, highlighting their most important aspects and including exercises between the theoretical explanations when considered appropriate. These theoretical sessions will be regularly delivered at the beginning of each topic.
- Practical academic sessions: Analysis and resolution of practical cases in relation with the theoretical concepts explained in the theoretical sessions.
- Seminars: Presentation and discussion of the proposed work, structured as seminars, in which the team work and oral skills and the defense of their own opinion and the ability to discuss about a topic or work are practiced.

Tutorials and support classes will be held before the final exam. Tutoring sessions and their schedule will be published in Aula Global.

ASSESSMENT SYSTEM

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

The mark will be based in a continuous evaluation and the result of the final exam that will cover all the material. In particular, it will be valued:

SE1. Participation in class.

SE2. Individual or team work carried out during the course.

SE3. Final exam.

CONTINUOUS EVALUATION:

The evaluation of the acquired knowledge and competences will be carried out through the realization of exercises, practices and works related to the thematic blocks described above. It would also be included the contribution to seminars and the forum in Aula Global. The student attitude and the participation in other activities proposed by the teachers will also be taken into account in this continuous evaluation block. The evaluation process is based on the student's personal work.

The tutorized works will have a weight of 45% in the final assessment of the subject. The active participation in the theoretical and practical classes will have a weight of 5%.

FINAL EXAM:

A theoretical-practical exam will be performed. It will consist on the interpretation of a series of theoretical questions and the resolution of a certain number of problems. This exam will have a weight of 50% in the final assessment of the subject. The relative weight of each part will be indicated in the test statement. The minimum score in the final exam to pass the subject is 4.0 over 10.0, notwithstanding the mark obtained in the continuous evaluation.

EXTRAORDINARY EXAMS:

The mark for the students attending any extraordinary examination will be the maximum between:

- 100% of the extraordinary exam mark, or

% end-of-term-examination/test: 50

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

b) 50% of the extraordinary exam mark and 50% of the continuous evaluation, if it is available in the same course.

ACADEMIC CONDUCT:

All exams will be closed-book, closed-notes, no PC or mobile phone, or anything else other than a pen and the exam itself. Plagiarism, cheating or other acts of academic dishonesty will be not tolerated. Any infractions whatsoever will result in a failing grade.

BASIC BIBLIOGRAPHY

- UNE 209001:2002 IN Guía para la gestión y el mantenimiento de productos sanitarios activos no implantables., ., 2002
- UNE-EN 13269:2007 Guía para la preparación de contratos de mantenimiento, ., 2007
- UNE-EN ISO 10012:2003 Sistemas de gestión de las mediciones, ., 2003
- UNE-EN ISO 10012:2003 ERRATUM - Sistemas de gestión de las mediciones. , ., 2003

ADDITIONAL BIBLIOGRAPHY

- UNE 179003:2013 Servicios sanitarios. Gestión de riesgos para la seguridad del paciente., ., 2013
- UNE-EN 13306:2011 Mantenimiento. Terminología del mantenimiento, ., 2011
- UNE-EN 60601-1/A1:1996 Equipos electromédicos. Requisitos generales para la seguridad, ., 1996