

Academic Year: (2024 / 2025)

Review date: 25-04-2023

Department assigned to the subject: Bioengineering Department

Coordinating teacher: TOLEDO HERAS, MARIA PAULA DE

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

No requirements apart from those to be admitted into the Master Programme

OBJECTIVES**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.

CG1 Ability to learn new methods and technologies, based on the mastery of scientific subjects and specialized techniques of Clinical Engineering, as well as to adapt to new situations.

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.

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.

CE12 Ability to install and maintain hospital infrastructures under quality criteria, in safety conditions and in compliance 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

To overcome this matter, students should be able to:

Analyze and evaluate hospital facilities through the development of conceptual designs, selection of

elements and application components in them.

Know the legal and regulatory framework applicable to hospital facilities in order to manage, supervise and analyze the assembly of facilities, systems and equipment.

Identify and understand the location of facilities and systems to specify, plan, manage and supervise assembly processes, diagnosis procedures, planning and maintenance management and disassembly of them.

Evaluate the state of the technological park, relating it to the care and clinical needs and economic resources to prepare a renovation and acquisition plan.

Plan and manage the maintenance of facilities, systems and equipment, optimizing execution times, material and human resources.

Elaborate and manage all the documentation derived from the hospital facilities and their systems, considering the current legislation.

Evaluate situations of prevention of labor risks and environmental protection, proposing and applying personal and collective prevention measures, in accordance with the applicable regulations.

Carry out the monitoring and supervision of the hospital facilities, verifying that the conditions of quality and safety are met in accordance with the technical documentation and current regulations.

Prepare and manage the documentation derived from maintenance, assembly processes, planning, management and supervision of hospital facilities.

Manage and monitor costs, interventions, safety tests, operation and waste management related to the maintenance of hospital facilities

Characterize the different elements that intervene in the process of creating a health information system, relating them to the key factors of the healthcare activity

DESCRIPTION OF CONTENTS: PROGRAMME

1. Communication networks and protocols

1.1. TCP / IP

1.2. OSI and ISO model comparison

1.3. HUB, Switch and router devices

1.4. IP address

2. Hospital information systems

2.1. Representation of information in medicine

2.2. Standard reference model (HL7, RIM and EN13606)

2.3. The electronic patient record

2.4. Vocabularies and terminologies (SNOMED)

2.5 Hospital Information Systems (HIS)

2.6. Standards for the interoperability of health information systems (HL7, IHE)

2.7. Security, confidentiality, authentication

3. Integration of the medical image in hospital information systems

3.1. RIS and PACS

3.2. The DICOM standard

3.3. Other departmental information systems in the hospital

4. Information systems of extra-hospital scope

4.1. Health information systems of regional or national scope

4.2. Telemedicine and digital health

5. Artificial intelligence in health information systems

LEARNING ACTIVITIES AND METHODOLOGY

LEARNING ACTIVITIES

AF1 Theoretical class

AF2 Practical classes

AF3 Theoretical practical classes

AF5 Tutorials

AF6 Group work

AF7 Individual student work

AF9 Face-to-face evaluation tests

Code

Activity No.	Total hours	No. Presential hours	% Presence Student
AF1	40	40	100%
AF2	10	10	100%
AF3	13	13	100%
AF5	18	4	22.2%
AF6	40	0	0
AF7	120	0	0
AF9	4	4	100%
TOTAL MATERIA	245	71	28.97%

TEACHING METHODOLOGIES TO BE USED IN THIS MATERIA

MD1 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.
 MD3 Resolution of practical cases, problems, etc. raised by the teacher individually or in groups.
 MD5 Preparation of papers and reports individually or in groups.

ASSESSMENT SYSTEM

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

EVALUATION SYSTEM

SE1	Student participation
SE2	Individual or group assignments
SE3	Final exam

Evaluation system	Min weight (%)	Max weight (%)
SE1	0 %	10 %
SE2	30 %	50 %
SE3	40 %	70 %

Extraordinary call:
 (2) 100% of the extraordinary exam

BASIC BIBLIOGRAPHY

- Editors: Shortliffe, Edward H., Cimino, James J Biomedical Informatics. Computer Applications in Health Care and Biomedicine, Springer-Verlag, 2014
- Oleg S. Pianykh Digital imaging and communications in medicine (DICOM) : a practical introduction and survival guide, Springer, 2012

ADDITIONAL BIBLIOGRAPHY

- Javier Carnicero. Andrés Fernández. Manual de Salud Electrónica de la Sociedad Española de Informática de la Salud, Publicación de las Naciones Unidas, 2011

BASIC ELECTRONIC RESOURCES

- AENOR . Norma UNE 71038:1990 EX : http://www.ca.aenor.es/aenor/normas/normas/fichanorma.asp?tipo=N&codigo=N0006946#.WvQjtJftZaQ
- AENOR . Norma UNE 71039:1988 EX : http://www.aenor.es/aenor/normas/normas/fichanorma.asp?tipo=N&codigo=N0006947#.WvQj8pftZaQ

- DICOM Library . PACS storage calculator: <https://www.dicomlibrary.com/dicom/pacs-storage-calculator/>
- HL7 . HL7: <http://www.hl7.org/>
- IHE . Integrating the healthcare Enterprise : <http://www.ihe-e.org>
- Javier Carnicero. Andrés Fernández. . Manual de Salud Electrónica de la Sociedad Española de Informática de la Salud: <https://www.cepal.org/es/publicaciones/3023-manual-salud-electronica-directivos-servicios-sistemas-salud>
- Personal Connected Health Alliance . Personal Connected Health Alliance: <https://www.pchalliance.org/>
- Siemens . Siemens Syngo demo: <https://wv2demo2.hipgraphics.com/>