Course guide
820029 - SHB - Safety in Hospitals

Last modified: 04/06/2026

Unit in charge: Barcelona East School of Engineering
Teaching unit: 710 - EEL - Department of Electronic Engineering.

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

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

LECTURER

Coordinating lecturer: PERE JOAN RIU COSTA

Others: Segon quadrimestre:
GEORGINA COMPANY SE - Grup: M13, Grup: M14
MARIA AMOR DUCH GUILLEN - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15
PERE JOAN RIU COSTA - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15
GIOVANNI VESCIO - Grup: M11, Grup: M12, Grup: M15

REQUIREMENTS

EQUIPS DE MONITORATGE, DIAGNÒSTIC I TERÀPIA i ENGINYERIA CLÍNICA - Irequisits

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
2. Manage health and safety in hospitals.

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

Expositive Classes, cooperative learnig and project based learning

LEARNING OBJECTIVES OF THE SUBJECT

Understand the concept of risk and acquire knowledge of the methodologies used to assess risk. Understand the origin of dangers in hospital environments. Understand the relationship between safety and functionality in a medical device. Apply the concept of safety to medical devices and facilities. Identify the applicable standards and legislation. Understand the responsibility of the manufacturer, the installator and the end user with respect to safety in a hospital environment.

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

Risk Assessment

Description:
Risk identification. Assessment of potential damage. Risk assessment. risk analysis and evaluation.

Specific objectives:
Understand the concept of risk and the methodologies used to assess it.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Sources of risk in hospital environments

Description:
Electric shock. Effects of DC, AC and pulsed electrical discharges. Mechanical and thermal risks. Chemical and biological risks. Esterilitzation. Explosive athmosferes. Non-ionizing radiation effects and exposure guidelines. Ionizing radiation fundamentals, biological effects and measurement techniques.

Specific objectives:
Understand the relationship between safety and functionality in medical devices. Gain knowledge of the biological basis associated to dangers in hospitals and the different sources of risk.

Full-or-part-time: 28h
Theory classes: 12h
Self study : 16h

Safety of medical devices

Description:
Electromedical equipment. Classification of equipment with respect to risk. Diagnostic and therapeutic equipment. Case studies (ECG, EEG, Ultrasound, etc.). Medical devices based on ionizing radiation and risks associated to external irradiation. Safety standards. Case studies (X-Ray, cobalt therapy. electron accelerator). Medical Systems. Equipment interconnection. Electromagnetic Compatibility as a risk factor.

Specific objectives:
Apply the risk concepts to different medical devices

Full-or-part-time: 26h
Theory classes: 8h
Laboratory classes: 6h
Self study : 12h

Safety of installations

Description:
Electrical installations. Power supply. Isolation transformers. Extra low voltage for medical device safety. Equipotentiality. Applicable standards. Ionizing radiation facilities. Standards, design and zone identification

Specific objectives:
Apply the concept of risk to different medical facilities

Full-or-part-time: 30h
Theory classes: 10h
Laboratory classes: 4h
Self study : 16h

Safety Standards

Description:
European Directives. Medical devices. Active implantable medical devices. In-vitro diagnostic devices. Standards for medical device safety. Medical device certification.

Specific objectives:
Be able to identify the relevant standards related to safety of medical devices and facilities.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

Project on risk analysis and safety design of a medical device/facility

Description:
Project based learnig activity on the analysis of the risk associated with a particular medical device or facility, the design of the safety aspects and the identification of the applicalbe safety standards

Specific objectives:
To be able to synthetize all the aspects related to safety of a medical devide or facility

Related activities:
Public presentation of the work performed

Full-or-part-time: 46h
Theory classes: 7h
Laboratory classes: 5h
Self study : 34h

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**.

Individual and group work will be assessed by means of tests, assignements and work presentations.
Final exam: 35%
Project: 20%
Lab activities/reports: 20%
Half-term test: 25%

There is NO re-testing in this subject

BIBLIOGRAPHY

Basic:
- Charney, William (ed.). Handbook of modern hospital safety. 2nd ed. Boca Raton [etc.]: CRC Press, cop. 2010. ISBN 9781420047851.
- Ortega Aramburu, X.; Jorba, J. Las radiaciones ionizantes : utilización y riesgos [on line]. 2a ed. Barcelona: Edicions UPC, 1996-2001 [Consultation: 11/06/2020]. Available on: http://hdl.handle.net/2099.3/36551. ISBN 8483011700.