Course guide
240324 - 240NR028 - Rehabilitation Equipment

Last modified: 16/05/2023

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering.

Degree: MASTER'S DEGREE IN NEUROENGINEERING AND REHABILITATION (Syllabus 2020). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: Ramos Castro, Juan Jose

Others: Miquel A. Mañanas
Rocío Sánchezâ□□Carrión Abascal
Itziar de Lecuona Ramírez
Xavier Canals
Claire Murphy

TEACHING METHODOLOGY

The course will have a theoretical approach with some practice sessions at the end of the semester. The theory sessions will explain concepts and perform exercises at the end of each session. Some of the sessions will include experts who will explain the state of the art. In laboratory sessions, students will use control and modeling software for respiratory rehabilitation systems.

LEARNING OBJECTIVES OF THE SUBJECT

The aim of the course is to introduce students to the applications of rehabilitation equipment for patients with neurological, cardiac and respiratory injuries as well as the bioethical and regulatory aspects of the use of these systems in clinical practice.

STUDY LOAD

Type	Hours	Percentage
Hours large group	21,0	28.00
Hours small group	6,0	8.00
Self study	48,0	64.00

Total learning time: 75 h

CONTENTS

Neurocognitive Rehabilitation Systems

Description:
- Neuropsychological disorders in patients with acquired brain damage
- Approaches to neuropsychological rehabilitation
- Innovation and clinical research in neuropsychology
- New technologies in neuropsychological rehabilitation

Related activities:
- Theory lesson
- Case studies

Full-or-part-time: 16h
Theory classes: 6h
Guided activities: 2h
Self study : 8h

Bioethics

Description:
Ethical, legal and social aspects
- International and European legal frameworks
- Ethical and legal aspects of personal data protection (GDPR)
- Responsible research and innovation

Full-or-part-time: 11h
Theory classes: 4h
Self study : 7h

CE marking (MDR) and risk analysis

Description:
- Introduction. Health technology requirements
- EU requirements: CE MDR marking
- US Requirements: CDRH-FDA
- ISO 14971 Risk Management
- Recommendations. Colloquium

Full-or-part-time: 11h
Theory classes: 4h
Self study : 7h

Cardiac rehabilitation, respiratory therapy and mechanical ventilation

Description:
- Rehabilitació Cardíaca: Incidència de CVD, Exercici i Activitat Física, Definició de Rehabilitació Cardíaca, Implementació de CR
- Sistema de control respiratori
- Rehabilitació pulmonar
- Equips de teràpia de rehabilitació
- Ventilació total: no invasiva
- Ventilació mecànica
• Conceptes bàsics
• Com funcionen els ventiladors
• Sistema de control
• Modes de ventilació

Full-or-part-time: 32h
Theory classes: 8h
Practical classes: 4h
Self study : 20h

GRADING SYSTEM

Throughout the course there will be 4 tests at the end of each topic and a theoretical + practical work in the respiratory rehabilitation session. The AC continuous assessment grade will be calculated as:
AC = 0.15 (NT1 + NT2 + NT3 + NT4) + 0.35 TTP
At the end of the course there will be a final exam with an EF grade.
The grade of the subject will be calculated as: max (EF, 0.5 EF + 0.5 AC)

EXAMINATION RULES.

The practices and the presentation of the theory work will be done in groups of two people. The exam will be individual.