

69308 - Ergonomics and evaluation of functional capacity

Syllabus Information

Academic Year: 2019/20

Subject: 69308 - Ergonomics and evaluation of functional capacity

Faculty / School: 110 -

Degree: 547 - Master's in Biomedical Engineering

ECTS: 3.0

Year: 1

Semester: Second semester

Subject Type: Optional

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures where the main contents are presented and discussed; computer lab sessions, practical tasks based on real application, and specific research activities.

Students are expected to participate actively in the class throughout the semester.

4.2.Learning tasks

The course includes the following learning tasks:

- **A01 Lectures (22 hours)**. The main course contents are presented and student participation is encouraged. There is audiovisual support to present practical cases and examples of specific hardware and software used in this field. The participation of a forensic doctor of the Institute of Legal Medicine of Aragon is scheduled to impart a master class about functional capacity evaluation and legal medical procedures.
- **A03 Computer Lab practices (4 hours)**. Sessions will be conducted in small groups of 2 or 3 students with specific hardware and software of application in Ergonomics and Functional Capacity Evaluation assessments.

They will use motion capture systems based on wireless or optical sensors which are available in the biomechanics laboratory of I3A and in the Area of engineering project of EINA. These resources can be used later for the students in the development of their assignments.

- **A05 Assignments.** In pairs or group of 3 students, they should elaborate two assignments, one on the field of ergonomics of work-product, and the other on the field of functional capacity assessment. To prepare these assignments students will use evaluation systems (software-hardware) employed in the practice sessions -they are available in laboratories and areas referred. Students will submit a written report of each case study, including a literature review, case description, methods and procedures used, analysis of results and final conclusions. These reports should be orally defended.
- **A06 Tutorials.** Office hours when students can review and discuss the topics presented in both theoretical and practical classes or solve doubts concerning the assignment.
- **A08 Assessment.** The student will take an exam and submit several reports derived from the computer sessions and the practical tasks.

4.3.Syllabus

The course will address the following topics:

1. **Ergonomic objects.** Ergonomics of work and product. Fields of application. Ergonomic methodology.
2. **Ergonomics, productivity and quality in the industry.**
3. **Musculoskeletal disorders (MSDs) of the workforce.** Movements and postures. Musculoskeletal system. Location of MSDs. Ergonomic intervention.
4. **Biomechanics and anthropometry.** Skeletal model. Anatomical drawings, reference systems of the body segments and joint movements. Biomechanical models of different percentiles of man and woman. Anthropomorphic models.
5. **Ergonomic analysis and evaluation** based on simulation and 3D digital models. Motion capture application in ergonomic analysis systems.
6. **Ergonomic analysis in product design.**
7. **Biomechanical analysis.** Reference systems of the body segments. Angles, displacements, velocities and linear and angular accelerations. Specific software.
8. **Postural load.** REBA Method (Rapid Entire Body Assessment). Risk levels and intervention. Using specific software.
9. **Lifting loads.** NIOSH equation. Single-tasking and multitasking. Using specific software.
10. **Evaluation of high-frequency repetitive upper limb movements.** UNE-ENE-1005-52007. MoveHuman-FORCES method (UZ).
11. **Functional Capacity Evaluation (FCE).** Object and field of application.
12. **Damage Valuation.** Medical-legal and forensic implications.
13. **Capacity assessment of the musculoskeletal system.** Methodologies, procedures and interpretation of results.
14. **Application of virtual reality systems** in the field of ergonomics and Functional Capacity Assessment.

4.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=69308&year=2019