

Academic Year/course: 2022/23

69708 - Ergonomics and evaluation of functional capacity

Syllabus Information

Academic Year: 2022/23

Subject: 69708 - Ergonomics and evaluation of functional capacity

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 633 - Master's Degree in Biomedical Engineering

ECTS: 3.0

Year:

Semester: Second semester

Subject Type: Optional

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process will be developed at various levels: lectures in which student participation will be encouraged, practical classes with specific software and hardware, activities and practical work of application or research. The proposed methodology tries to encourage the student's continuous work.

4.2. Learning tasks

In order for students to achieve the learning outcomes described above and to acquire the competencies designed for this course, the following training activities are proposed:

A01 Participative class (18 hours).

Presentation by the professor of the main contents of the subject. This activity will be carried out in the classroom. Audiovisual means will be used to present practical cases and demonstrations of the specific software and hardware to be used in this field.

A03 Laboratory practices. (8 hours).

Practices will be carried out in small groups of 4 or 5 students with specific hardware and software of application in ergonomic evaluations and Functional Capacity Evaluation. Motion capture systems based on optical or inertial units available in the biomechanics laboratory of the I3A and in Project Engineering Area will be used (EINA).

A05 Practical application work.

Practical work should be carried out in groups of 4 or 5 students.

Specifically, one of application in the field of work-product ergonomics and another in the field of functional capacity assessment.

The assessment systems (software-hardware) used in the practicals and available in the laboratories and facilities mentioned above will be used for their realization.

A written assessment report must be written for each case studied, including bibliographic review, description of the case, assessment methods and procedures used, analysis of results and final conclusions.

These reports must be presented and defended orally.

A06: Tutoring.

Personalized attention to the student in order to review and discuss the materials and topics presented in both theoretical and practical classes and especially to support the completion of their practical work.

A08: Evaluation.

Set of theoretical-practical written tests and presentation of reports or papers used in the evaluation of the student's progress. Details can be found in the section corresponding to the evaluation activities.

4.3. Syllabus

The different concepts will be addressed with case studies and the use of specific software and hardware, in increasing order of complexity. Specifically, the following topics will be addressed:

Object of Ergonomics. Work and product ergonomics. Fields of application. Ergonomic methodology. Ergonomics, productivity and quality.

Musculoskeletal disorders of work activity. Movements and postures. Musculoskeletal system. Localization of Musculoskeletal disorders. Ergonomic intervention.

Biomechanics and Anthropometry. Skeletal model. Anatomical planes, reference systems of body segments and joint movements. Biomechanical models of different percentiles of men and women. Anthropomorphic models.

Ergonomic analysis and evaluation based on 3D simulation and digital models. Reproducing the environment and movement. Application of MoCap systems for ergonomic analysis.

Ergonomic analysis of products on 3D design. Visual field analysis.

Biomechanical analysis. Body segment reference systems. Angles, displacements, velocities and linear and angular accelerations. Use of specific software.

Postural load analysis. REBA method (Rapid Entire Body Assessment). Risk levels and intervention. Use of specific software.

Load handling. NIOSH equation. Single and multi-tasking. Use of specific software.

Evaluation of repetitive movements at high frequency of the upper limbs. UNE-ENE-1005-52007. MoveHuman-FORCES (UZ) method. Monotask and multitask.

Functional Capacity Evaluation (FCE). Purpose and field of application.

Evaluation of Bodily Injury. Forensic implications.

Application systems in the field of musculoskeletal system capacity assessment. Methodologies, procedures and interpretation of results.

Application of virtual reality systems in the field of ergonomics and Functional Capacity Evaluation.

4.4. Course planning and calendar

The calendar of the course, both for classroom and laboratory sessions, will be determined by the academic calendar established by the center for the corresponding course. The schedule for the presentation of assignments will be announced at the beginning of the course.

The course is taught in the spring term. Among the main activities are the exposition of theoretical contents, the resolution of cases, the realization of laboratory practices and the realization of tutored practical work related to the contents of the course.

The start and end dates of the theoretical and problem classes, as well as the dates of the laboratory practicals and the global evaluation tests will be set by the School of Engineering and Architecture and published on the web page of the master's degree (<http://www.masterib.es>).

The dates of delivery and monitoring of the tutored practical work will be announced well in advance in class and on the web page of the course <https://moodle.unizar.es/>.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=69308>