Design in biomechanics and ergonomy

Academic Year: (2023 / 2024) **Review date: 04-12-2023**

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: FUENTES DEL TORO, SERGIO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

DESCRIPTION OF CONTENTS: PROGRAMME

Block I. Introduction to biomechanics:
- Definition of biomechanics
- Background to biomechanics
- Applications of biomechanics

Block II. Design of biomechanical tests:
- Biomechanical testing and analysis techniques.
- Biomechanical test characteristics.
- Requirements and risks of biomechanical testing.
- Planning a biomechanical test.

Block III. Ergonomic design:
- Ergonomic design concepts
- Anthropometry
- Interaction of elements with the human body
- Ergonomic design of the workplace

Block IV. Design of personalised components:
- Design adapted to the user
- Adjustable design
- Ergonomics and disability

LEARNING ACTIVITIES AND METHODOLOGY

Throughout the lectures, the main contents of the subject will be presented, encouraging student participation throughout the sessions, stimulating discussion on the different topics covered. In addition, this participation will be promoted by carrying out exercises in the classroom.

In order to consolidate some of the concepts of the syllabus, the classes will be supported by experimental tests, both in the computer classroom and using tools and/or different technological elements. In addition, a project will be proposed. Part of this work will be developed throughout some of the sessions of the subject and with the help of the teachers of the subject.

In order to be able to use the techniques learnt in the theoretical sessions, two laboratory practicals will be carried out analysing different practical cases.

The student will be informed via Aula Global of a personalised tutoring schedule, with the aim of resolving any doubts that the student may have about the contents covered in the course.

ASSESSMENT SYSTEM

The evaluation of the student will be carried out through the demonstration of having achieved the expected knowledge by means of several evaluation activities, as described below:
- Partial exams. There will be two over the duration of the course, in which the knowledge acquired in the theoretical sessions will be assessed.
- Laboratory practicals. Two laboratory practicals will be carried out during the four-month period. These practical sessions will be weighted and will form part of the mark in the continuous assessment. Attendance at both practical sessions is compulsory in order to pass the course.

Each of these tests will have a percentage weight according to the following in continuous assessment:

- Partial exams: 30%.
- Work related to the concepts of the subject: 40%.
- Practical work related to the subject: 30%.

In the event of failing the continuous assessment, students may sit the ordinary exams, where the assessment system will be as follows:
- Continuous assessment: 30%.
- Ordinary exam: 70 %.

For the extraordinary exam, the corresponding mark will be calculated in two different ways, the final mark being the maximum between:
- 30% continuous assessment + 70% extraordinary exam
- 100 % extraordinary exams

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Bridger, R. Introduction to Ergonomics, Taylor & Francis, 2003
- Duane Knudson Fundamentals of Biomechanics, Springer, 2007
- INSHT Ergonomía, INNSHT, 1998

ADDITIONAL BIBLIOGRAPHY

- Aguado Jódar, X., González Montesinos, J. L., Izquierdo Redín, M., Aguado Jódar, X. Biomecánica Fuera y Dentro Del Laboratorio, Universidad de León, 1997
- Fung, Y. C. Biomechanics: Mechanical Properties of Living Tissues, Springer, 2013