

## 69309 - Motion capture and characterisation

### Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	547 - Master's in Biomedical Engineering
ECTS	3.0
Year	1
Semester	Second semester
Subject Type	Optional
Module	---

### **1.General information**

#### **1.1.Introduction**

#### **1.2.Recommendations to take this course**

#### **1.3.Context and importance of this course in the degree**

#### **1.4.Activities and key dates**

### **2.Learning goals**

#### **2.1.Learning goals**

#### **2.2.Importance of learning goals**

### **3.Aims of the course and competences**

#### **3.1.Aims of the course**

#### **3.2.Competences**

### **4.Assessment (1st and 2nd call)**

#### **4.1.Assessment tasks (description of tasks, marking system and assessment criteria)**

### **5.Methodology, learning tasks, syllabus and resources**

#### **5.1.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; lab sessions using motion capture hardware and software, practical tasks based on real application, and specific research activities.

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

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### 5.2.Learning tasks

The course includes the following learning tasks:

- **A01 Lectures** (21 hours). The main course contents are presented. They take place in the classroom using a slideshow presentation program. Student participation is encouraged.
- **A03 Lab sessions** (7 hours). Lab sessions will be developed in small groups. These activities will use human motion capture systems that are available in the Department of Design and Manufacturing Engineering at the Escuela de Ingeniería y Arquitectura (EINA).
- **A05 Assignment**. The practical task will be done between two or three students. With this task, the students have to show that they have assimilated the course contents. Students should present a report of their practical task and defend it before teachers.
- **A06 Tutorials**. Students may ask any questions they might have about unclear contents of the course.
- **A08 Assessment**. The student will take an exam and a report derived from the development of practical tasks.

### 5.3.Syllabus

The course will address the following topics:

1. Introduction to human motion capture
2. Mechanical basics
3. Human motion capture systems
4. Optical human motion capture systems
5. Human motion capture systems based on inertial sensors
6. Biomechanical model and reconstruction of the movement
7. Dynamic
8. Simulation and 3D animation software of human motion
9. Musculoskeletal models
10. Applications

### 5.4.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.

### 5.5.Bibliography and recommended resources

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#### LISTADO DE URLs:

Ana Cristina Royo Sánchez; Juan José Aguilar Martín; Jorge Santolaria Mazo

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Collins MM, Scholar M. Validation of a Protocol for Motion Analysis.

[<http://forms.gradsch.psu.edu/diversity/mcnair/2003/collins.pdf>]

"Comparison meeting of motion analysis systems'02" Clinical Gait Analysis Forum of Japan, 2002.

[[http://www.gait-analysis.jp/comparison2002/protocol/protocol\\_eng.html](http://www.gait-analysis.jp/comparison2002/protocol/protocol_eng.html)]

"Comparison meeting of motion analysis systems'99" Clinical Gait Analysis Forum of Japan, 1999

[<http://www.gait-analysis.jp/comparison99/comp99.html>]

"Comparison meeting of motion analysis systems'99" Clinical Gait Analysis Forum of Japan, 1999. Test Protocol (for camera-based systems)

[<http://www.gait-analysis.jp/comparison99/protcol99.html>]

Horn, B.K.P., 2000, Tsai's Camera Calibration Method Revisited

[[http://people.csail.mit.edu/bkph/articles/Tsai\\_Revisited.pdf](http://people.csail.mit.edu/bkph/articles/Tsai_Revisited.pdf)]

INSHT. Datos antropométricos de la población laboral española. 2011

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Marín Zurdo, J. J.; Boné Pina, M.J, and Benito Gil, C. "Evaluación de Riesgos de Manipulación Repetitiva a Alta Frecuencia Basada en Análisis de Esfuerzos Dinámicos en las Articulaciones sobre Modelos Humanos Digitales". Ciencia & Trabajo, 2013, vol. 15, no. 47. pp. 86-93  
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