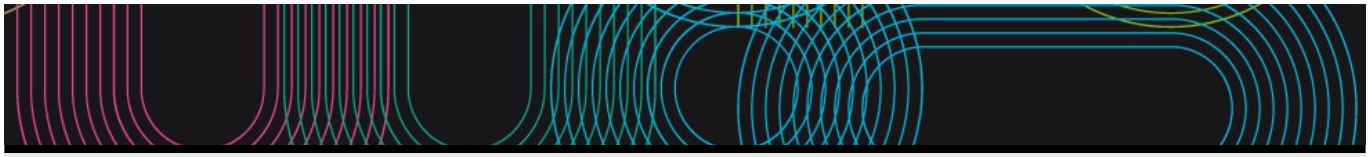
Universidade Vigo

Subject Guide 2022 / 2023



IDENTIFYING DATA				
(*)Análisis biomecánico de actividades e funcións humanas				
Subject	(*)Análisis biomecánico de actividades e funcións humanas			
Code	V04M192V01105			
Study programme	Máster Universitario en Ingeniería Biomédica			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	4.5	Mandatory	1st	1st
Teaching language				
Department				
Coordinator	López Campos, José Ángel			
Lecturers	López Campos, José Ángel			
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Web				
General description				

Skills	
Code	
A5	Students must possess the learning skills that enable them to continue studying in a way that will be largely self-directed or autonomous.
B3	Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.
C5	Ability to develop biomechanical models of the musculoskeletal system based on the anthropometry of the human body and the mechanical laws of motion.

Learning outcomes	
Expected results from this subject	Training and Learning Results
To know the principles of biomechanical analysis of human activities and functions	B3 C5
To apply knowledge of the principles of biomechanical analysis of human activities and functions in the design within the field of biomedical engineering	A5 B3 C5

Contents	
Topic	
1.- Technical features related to the analysis of muscular activation using EMG.	1.1. - Obtaining of raw signal. Protocols for data adcquisition. 1.2. - Signal processing. Filters, smoothing and normalisation. 1.3. - Implementation of signal processing tools.
2.- Motion capture using optical devices.	2.1. - Motion capture systems using cameras and markers. 2.2. - Calibration of optical systems. 2.3. - Capture, treatment and data export.

3.- Computational simulation of biomechanic systems.	3.1. - Multi-body models for the simulation of biomechanic systems. 3.2. - Scaling and inverse kinematics. 3.3. - Dynamic of biomechanic systems, muscular control and reverse dynamics. Systems for motion assistant.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	0	15
Practicum, External practices and clinical practices	21	0	21
Autonomous problem solving	0	50	50
Mentored work	0	26.5	26.5
Systematic observation	0	0	0
Project	0	26.5	26.5
Report of practices, practicum and external practices	0	0	0

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Sessions in which the professor exposes the new theoretical concepts to the students, accompanied of brief practical examples.
Practicum, External practices and clinical practices	Sessions in which, the theoretical concepts developed during the lectures are carried to the practice by the student with the support of the educational. Furthermore, the student will receive training about the tools and methods applied in the resolution of practical problems.
Autonomous problem solving	Taking as starting point the concepts that were depeloved during lectures and the practical sessions, a set of problems are posed so that the student can apply the tools and skills adcquired in the resolution of problems.
Mentored work	Extensive study in which the student will apply all the tools developed in the matter to carry out a study with a wide scope to the whole of the topics that were covered by the subject.

Personalized assistance

Methodologies	Description
Mentored work	Personalised sessions will be available for the student, in order to answer the doubts that can arise during the resolution of problems.

Tests	Description
Project	Personalised sessions will be available for the student, they will be oriented to give guidelines to the student for performing the work and in order to remember and apply theoretical concepts in the project developed.

Assessment

	Description	Qualification	Training and Learning Results		
Systematic observation	The attitude of the student in the theoretical and practical lessons will be evaluated. Evaluation is performed by regarding participation, assistance and autonomous work.	20	A5	B3	
Project	The project delivered by the student will be evaluated.	50	A5	B3	C5
Report of practices, practicum and external practices	Continuous evaluation will be performed based on the ability of resolution of problems proposed during the practice lessons.	30	A5	B3	C5

Other comments on the Evaluation

Sources of information

Basic Bibliography

Biomechanics of the musculo-skeletal system, 0471978183, 2º, John Wiley and Sons, 1999

Complementary Bibliography

H. Moore, **MATLAB for Engineers**, 0133485978, 4º, Financial Times Prentice Hall, 2014

Recommendations