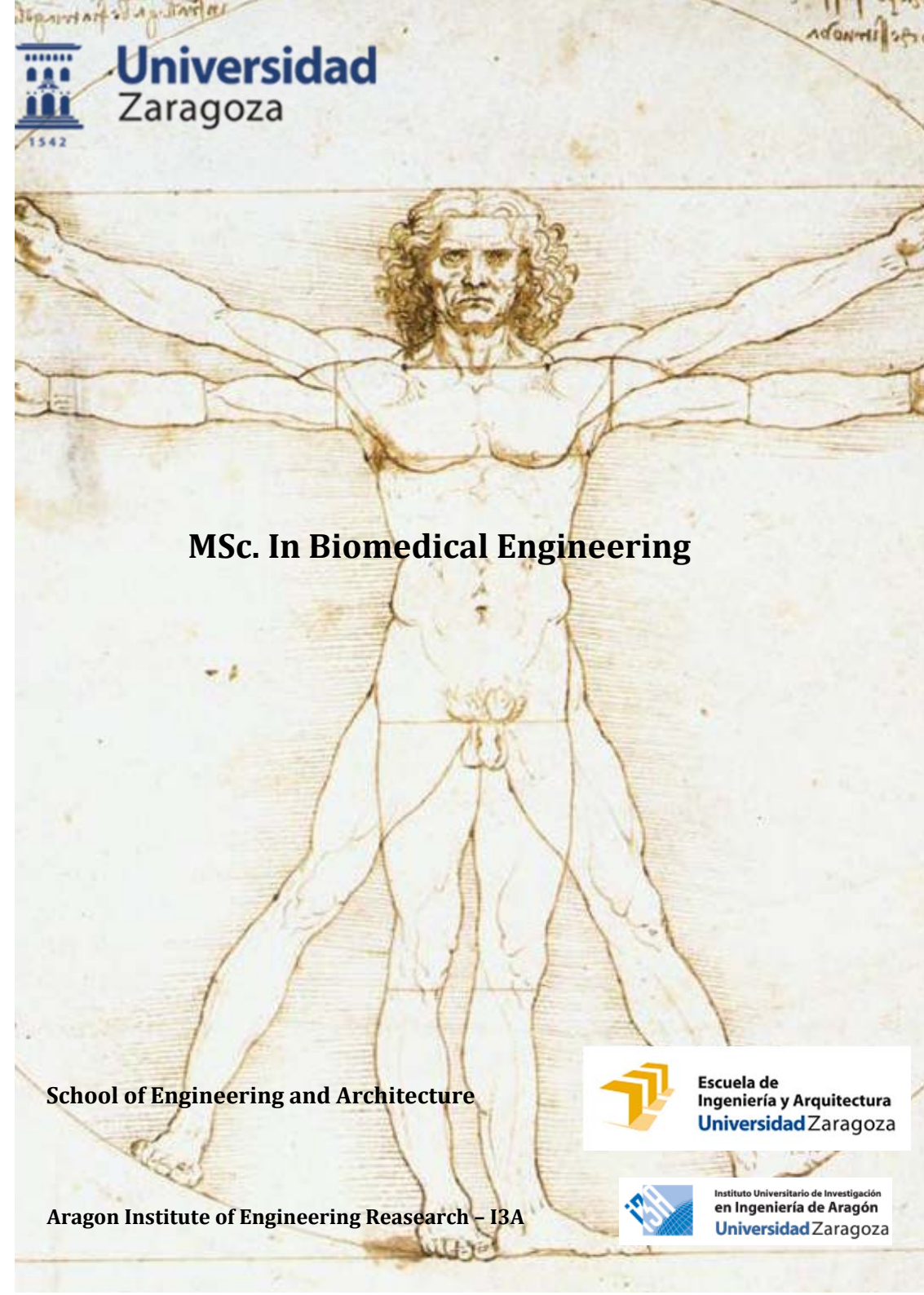


Module	Subject	Course	Cr.	Term.	Type
Biomedical courses***	Fundamentals of Anatomy, Physiology, Pathology and Therapeutics ***.	69300 – Fundamentals of Anatomy, Physiology, Pathology and Therapeutics***.	12	Fall	Core*
	Technical core courses	Biostatistics and numerical simulation in biomedical engineering	69301 – Biostatistics and numerical simulation in biomedical engineering.	6	Fall
Biomechanics and Biomaterials		69302 – Biomechanics and Biomaterials	6	Fall	Core
Signal processing and biomedical imaging		69303 – Signal processing and biomedical imaging	6	Fall	Core
Specialisation	Technologies in Biomechanics, Biomaterials and Tissue Engineering	69304 – Computer aided prosthesis and implant design	3	Spring	Opt
		69305 – Scaffolds and tissue engineering	3	Spring	Opt
		69306 – Modeling the mechanical behaviour of muscular-skeletal tissue	3	Spring	Opt
		69307 – Materials and Surface treatment for prosthesis and implants	3	Spring	Opt
		69308 – Ergonomics and evaluation of functional	3	Spring	Opt
		69309 – Motion capture and characterisation	3	Spring	Opt
		69310 – Biomechanical modeling of the cardiovascular system	3	Spring	Opt
		69311 – Cell mechanobiology	3	Spring	Opt
	Nano-medicine technologies	69312 – Nano-biomedicine: Fundamentals and applications	3	Spring	Opt
		69313 – Nano-therapy	3	Spring	Opt
		69314 – Nano-diagnosis	3	Spring	Opt
	Information and communication technologies in biomedical engineering	69315 - e-Health systems	3	Spring	Opt
		69316 – Models and systems of physiological control	3	Spring	Opt
		69317 – Computer vision and perception	3	Spring	Opt
		69318 – Medical Robotics and robotic exoskeleton	3	Spring	Opt
		69319 – Analysis of medical images	3	Spring	Opt
		69320 – Advanced treatment of biomedical signals	3	Spring	Opt
		69321 – Pattern recognition techniques	3	Spring	Opt
		69322 – Information systems in medicine	3	Spring	Opt
	Horizontal technologies	69323 – Interdisciplinary seminar	3	Yearly	Opt
		69324 – Scientific visualization and representation techniques	3	Spring	Opt
		69325 – Medical imaging capture techniques	3	Spring	Opt
		69326 – Radiotherapy technologies	3	Spring	Opt
		69327 – Bioelectricity and electrophysiology	3	Spring	Opt
		69328 – Optictechnologies in biomedicine	3	Spring	Opt
	Internships	- Internships will be recognized up to a maximum of 6 ECTS for both specialisations.	máx 6	-	Opt
TFM	Master Thesis	Master Thesis	15	-	Core

*** Students with a bachelor in Biomedical Engineering could request the exemption of the course: “69300-Fundamentals of Anatomy, Physiology, Pathology and Therapeutics”.



MSc. In Biomedical Engineering

School of Engineering and Architecture



Aragon Institute of Engineering Research – I3A

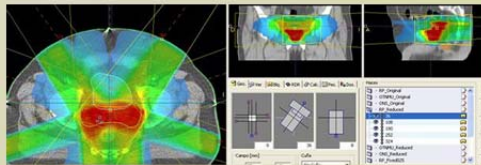


Objetives

This master trains professionals with scientific and technical abilities for solving engineering problems related to the fields of biology and medicine, in addition to perform activities of I+D+i in hospitals, industries of the health care sector, and research institutions.

In this regard, graduates from this master will achieved, according to the specialization followed within the master program, knowledge and abilities to perform professional or research within some of the following I+D+i lines:

- System analysis and modelling in biomechanics and mechanobiology
- Fundamentals of tissue engineering in regenerative medicine
- Biomaterials and particularities of biocompatible materials
- Biological signals and medical imaging
- Systems for health care management and telemedicine
- Analysis and modelling of biological systems
- Handicap support systems
- Electronics and biomedical instrumentation



Admission

Applicants to the MSc program in Biomedical Engineering must satisfy one of the following requisites:

- Bachelor degree in: Biomedical Engineering; Bachelor or MSc in: Mechanical Engineering, Electric Engineering, Electronic Engineering and Automation, Industrial Engineering, Computer Science Engineering, Engineering in Telecommunication Services and Technology, Chemical Engineering. In addition, five year engineering programs: Industrial Engineering, Computer Science Engineering, Chemical Engineering, Engineering in Telecommunications, and others related five years engineering programs.
- Bachelor or master degree in Physics, Mathematics or Chemistry.
- Three years bachelor degree in Technical Industrial Engineering, Computer Science Industrial Engineering, Telecommunications Technical Engineering (or equivalents). These options must come with the authorization of responsible of the MSc program.

Those students with a bachelor in Biomedical Engineering will be exempt from registering in the course: "Fundamentals of Anatomy, Physiology, Pathology and Therapeutics" for which they could request the exemption. All remaining students should register for this course unless they demonstrate to have acquired the competences during their previous training. In this case the student could request the exemption.

Curriculum

TIPO DE COURSE	CREDITS
Complementary courses*	12
Core courses	18
Optative courses **	30
Master Thesis	15
TOTAL NUMBER OF CREDITS	75

* Complementary courses (Biomedical fundamentals) are considered part of the MSc program. However, students with a Biomedical Engineering degree are exempt.

** Internships can be recognised up to 6 ECTS optative course.

Study Plan

The study plan of the Master consists of 75 ECTS, of which 15 correspond to the Master Thesis. From the remaining 60 ECTS, 30 are core courses and 30 are optative courses.

The master is intended to be completed in one year in addition to the master Thesis (TFM) that can be presented at December of the second year (estimated duration of the master: 15 months).

1 st Year	Biomedical courses 12 ECTS	Technical Core Courses 18 ECTS	Specialisation 30 ECTS
2 nd Year	Máster Thesis 15 ECTS		

In order to obtain the specialization in "Biomechanics and Advanced Biomaterials", the student must complete at least 24 ECTS from the module of the specialisation within the subjects: "Technologies in Biomechanics, biomaterials and tissue engineering", "Technologies in nano-medicine", "Horizontal technologies" and "Internships", as long as the sum of the completed credits in the first two subjects is not less than 18 ECTS. In addition, the topic of the TFM must be related to the subjects of the specialisation.

In order to obtain the specialization in "Information and communication technologies in biomedical engineering", the student must complete at least 24 ECTS from the module of the specialisation within the subjects: "Information and communication technologies in biomedical engineering", "Horizontal technologies" and "Internships", as long as the sum of the completed credits in the first two subjects is not less than 18 ECTS. In addition, the topic of the TFM must be related to the subjects of the specialisation.

It is also possible to complete the master without any specialisation.

The official language for the master is Spanish, though depending on the lecturer of the course, some optative may be lectured in English. However, the support material for any course maybe in English and the lecturer may propose some activities in English.

This master allows direct access to the PhD program in Biomedica Engineering, a dual program between the University of Zaragoza and the Universitat Politècnica de Catalunya.

More information: <http://www.masterib.eshttp://titulaciones.unizar.es/ing-biomedica/>

Contact: Secretary of the School of Engineering and Architecture. Torres Quevedo Building. Ph:+34 976 761 86