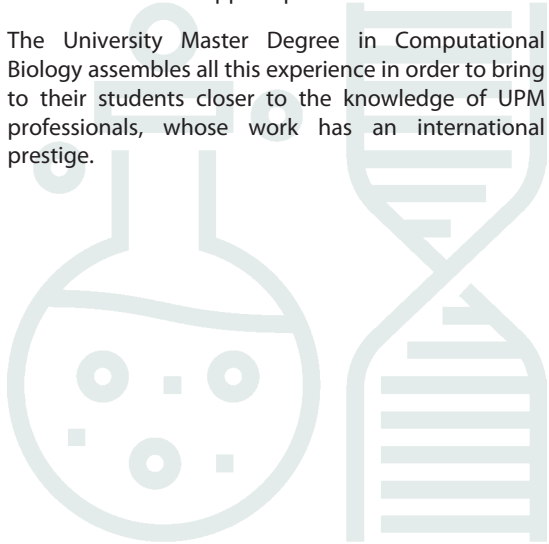## Why studying this Master Degree?

Both the scientific community and the pharmaceutical-biotech business are increasingly aware of the huge advantages in applying bio-computing tools to its research and production chains. As a consequence, today there is a great demand for professionals trained in Computational Biology.

The 'Universidad Politécnica de Madrid (UPM)' has wide experience in these knowledge areas: Computer Science and Biological Sciences, both from an educational and an applied point of view.

The University Master Degree in Computational Biology assembles all this experience in order to bring to their students closer to the knowledge of UPM professionals, whose work has an international prestige.

Goals:

This Master Degree aims to train professionals who are capable of understanding the biological problems they face, both in a business and in an academic context, providing the most appropriate bio-computing solution. The Master has an academic, scientific and professional orientation, thus more than 20 ECTS credits of practices are included in its program. The training will set the ground to the subsequent achievement of the Doctor Degree or to the Graduate incorporation to the professional activity.

Target group:

The University Master Degree in Computational Biology is aimed both at Graduates in Experimental Sciences who want to further their regular training, by expanding their knowledge in the area of computing, and at Computer Engineers who want to be trained in Bioinformatics.

Branch: Sciences
Area: Biotech
Orientation: Professional/ Research
Credits: 60 ECTS
Duration: Two semesters (September - July)
Education: Only presential courses
Number of places: 30
Language: English *
Interschool Master:
Escuela Técnica Superior de Ingeniería Agronómica, Alimentaria y de Biosistemas
Escuela Técnica Superior de Ingenieros Informáticos

Contact details:
Departamento de Biotecnología-Biología Vegetal
Escuela Técnica Superior de Ingeniería Agronómica, Alimentaria y de Biosistemas (ETSIAAB)
masterbc.etsiaab@upm.es
www.dia.fi.upm.es/masterbc/

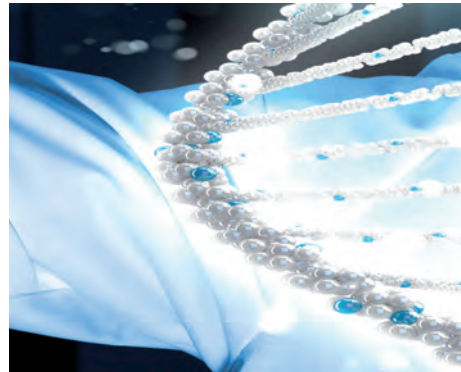Postgraduate Secretary's office:
secretaria.postgrado.etsiaab@upm.es
Tel. 910 670 766
For more information and registration:
www.etsiaab.upm.es/docencia/masteres

The subjects will be taught in Spanish if all the students are Spanish-speaking.

Escuela Técnica Superior de Ingeniería Agronómica, Alimentaria y de Biosistemas

MSc Degree in
Computational Biology

CAMPUS DE EXCELENCIA INTERNACIONAL
POLITÉCNICA

ETS de Ingeniería Agronómica, Alimentaria y de Biosistemas

ETSII
Escuela Técnica Superior de Ingeniería Informática

MSc Degree in Computational Biology
ETSIAAB

Structure

MODULE I	FUNDAMENTAL COURSES	9 - 18 ECTS
MODULE II	BRANCH: COMPUTATIONAL AND SYSTEMS BIOLOGY	0 - 15 ECTS
MODULE III	BRANCH: COMPUTATIONAL BIOLOGY AND DATA SCIENCE	0 - 15 ECTS
MODULE IV	PROFESSIONAL DEVELOPMENT AND TECHNOLOGY TRANSFER	3 ECTS
MODULE V	RESEARCH AND INNOVATION	3 - 12 ECTS
MODULE VI	FINAL MASTER DEGREE PROJECT (PROFESSIONAL AND/OR RESEARCH)	15 ECTS
ADITIONAL MODULE	COMPLEMENTARY FORMATION (if required)	6 - 12 ECTS

Curriculum

FUNDAMENTAL COURSES (COMPULSORY)	ECTS	SEM
Genomics Data Analysis and Visualization	6	1

FUNDAMENTAL COURSES (ELECTIVE)	ECTS	SEM
Statistical Analysis and Data Visualization	3	1
FAIR Data Management	3	1
Machine Learning	3	1
Bioinformatics Programming Challenges	3	1

Students will take a minimun of 3 ECTS and a maximun of 12 ECTS.

ELECTIVE COURSES (Branch: Computational and Systems Biology)	ECTS	SEM
Genomics-Assisted Breeding	3	1
Computational Approaches in Evolutionary Biology	3	1
Modelization and Simulation of Biosystems	3	1
Synthetic and Systems Biology	3	1
Computational Structural Biology for Lead Discovery	3	1
Biocomputing: Challenges, Solutions and Opportunities	3	1

For intensification in this Programme, students will take a minimun of 9 ECTS and a maximum of 18 ECTS.

A multisdiplinary training by the best professionals in Computation and Biology; many job opportunities

ELECTIVE COURSES (Branch: Computational Biology and Data Science)	ECTS	SEM
Health Data and Knowledge Management	3	1
Semantic Technologies	3	1
Knowledge Representation and Acquisition	3	1
Programmable Biology: DNA Computation and Biocircuits Engineering	3	1
Big Data Engineering	3	1

For intensification in this Programme, students will take a minimun of 9 ECTS and a maximun of 15 ECTS.

PROFESSIONAL DEVELOPMENT AND TECHNOLOGY TRANSFER	ECTS	SEM
Professional Development and Technology Transfer	3	2
Technological Innovation	3	2

Students MUST take at least 3 ECTS.

RESEARCH AND INNOVATION	ECTS	SEM
Internships: Enterprises or Research Institutions (elective)	9	2
Scientific Seminars (compulsory)	3	2

FINAL MASTER DEGREE PROJECT	ECTS	SEM
Professional/Research-orientated	15	Undefined

Partners