



UNIVERSITÀ
DEGLI STUDI
DI MILANO

Master's degree programme in

Quantitative biology

facoltà di

SCIENZE E TECNOLOGIE

Applications and admissions

Open, subject to entry requirements.

Admission requirements

- Applicants with a bachelor's degree in Biotechnology (L-2), Philosophy (L-5), Civil and environmental engineering (L-7), Information engineering (L-8), Biological Sciences (L-13), Chemical sciences and technology (L-27), Pharmaceutical sciences and technologies (L-29), Physical sciences and technology (L-30), Computer science and technology (L-31), Science and technology for the environment and nature (L-32), Economic sciences and statistics (L-33), Mathematical sciences (L-35), Statistics (L-41) will be admitted on condition that they have obtained sufficient knowledge, not less than 12 University credits (ects), in at least one of the following biology and biotechnology core disciplines specified in the Manifesto degli Studi.

- Language Requirements:

Knowledge of English (B2 certification). Students without a B2 level certification may be accepted on condition that their level of English proficiency, assessed during the interview, is evidently good.

The adequate personal preparation of the candidates, their ability to communicate in English and their motivation are decisive elements for the admission and they are going to be verified and tested during an admission interview.

Knowledge of Italian is not required for attendance.

Particular attention will be given to the knowledge in Biological subjects of candidates with non-biological backgrounds. In this case, the admission interview will identify gaps requiring extra study to be levelled off by the student with the support of tutors, before the official start of the courses.

Objectives

The Master's degree course in Quantitative biology prepares graduates in biological and biotechnological disciplines to operate at the intersection between biology and physics. The quantitative approach requires a physical understanding of biological phenomena and the development of mathematical and computational tools for the analysis, understanding, and redesign of biological systems. The aim is to train a new generation of experts with integrated skills in biology, chemistry, physics, mathematics and computer science, able to perform accurate experimental measurements and apply predictive theoretical models.

Career prospects

The Master's degree in Quantitative Biology provides employment opportunities in research institutes and industry in the areas of bio-nano-technologies, bio-pharmaceutical research, and in the development of high-tech research instrumentation.

Primary duties of a graduate in QB can range from analyze and optimize pre/clinical trials and predict outcomes using modeling and simulation, integration and interpretation of data from many sources to drive decision making in project management, apply molecular modeling and computer aided drug design techniques, basic use and maintenance of laboratory instrumentation, literature review.

The graduate in QB can be hired as junior research scientist, product scientist, junior research project manager, scientific application specialist, lab equipment service specialist.

Degree syllabus

I year

COMPULSORY LEARNING ACTIVITIES	ECTS
I semester	
Cell biophysics	6
Imaging in living cells	5
Mathematical modeling for Biology	6
Programming in Python	6
II semester	
Advanced molecular biology	9
Integrated structural biology	6
Measurement of nanoscale interactions in biological systems and data analysis	6
Molecular biophysics	6
Annual	
Principles of spectroscopy and applications to quantitative biology	10

II year

(to be made available as of academic year 2027/2028)

COMPULSORY LEARNING ACTIVITIES	ECTS
I semester	
Artificial intelligence in quantitative biology	6
The student must choose one of the following courses: I semester - Introduction to Logic - Non linear dynamics in quantitative biology - Structural bioinformatics - Synthetic biology II semester - Cell population dynamics	6

Other activities

- 12 ects for free choice courses
- Other training activities (3 ects)
- Thesis project and final dissertation (33 ects)

INFO

 **Disciplinary classification:** Industrial biotechnologies (LM-8 R)

 **Duration:** 2 years (120 ects)

 **Attendance:** mandatory.

 **Location:**

- Department of Biosciences - via Celoria, 26 - Milan
- Teaching Sector - via Celoria, 20 - Milan
- via Golgi, 19 - Milan

 **Websites:**

qbio.cdl.unimi.it
www.unimi.it



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