

Studying Biological Sciences at the



UNIVERSITÀ DEGLI STUDI DI MILANO

DBS



Dipartimento
di Bioscienze

Department of Biosciences

Department of Biosciences

<http://www.dbs.unimi.it/ecm/home>

Research

The Department of Biosciences is one of the top rated research departments in Italy. A wide range of advanced biological research activities are performed: curiosity-driven "basic science" to investigate the molecular basis of life and more strategic applied research to provide biotechnological solution for the future. The multidisciplinary research groups of the Department work in the area of structural biology, biochemistry, molecular biology, genetics, physiology, cell-biology, bioinformatics, ecology and evolution using a wide variety of model systems including bacteria, fungi, mammals and plants.

Research activities of the department pertain to five general scientific sectors: Evolution, Biodiversity and the Environment; Cell and Developmental Biology; Genes, Genomics and Proteomics; The Molecular and Cellular Basis of Human Health; Biophysics and Protein Science.

For an overview of **themes and lines of research** and **Funded research projects** please visit the websites below:

<http://eng.dbs.unimi.it/ecm/home/research/themes-and-lines>

<http://eng.dbs.unimi.it/ecm/home/research/funded-research-projects>

Head of Department: Prof. Lucia Colombo

Deputy Head: Prof. Marco Muzi Falconi

Teaching

The Department is both principal and associate coordinator of 10 first (Bachelor) or specialist (Master) degree courses in the areas of Biotechnologies, Biological sciences and Natural Sciences.

In addition, training at the PhD level is one of the top priorities of the Department of Biosciences. Therefore, the departmental faculty is deeply involved in several PhD programs in the biosciences field (Doctoral programs in Cellular and Molecular Biology, Animal Biology and Environmental Sciences).

For a complete overview of the teaching courses please visit the websites below:

<http://eng.dbs.unimi.it/ecm/home/teaching>

Faculty Sciences and Technology

<http://www.scienzefn.unimi.it/>

Head of the departmental teaching board of Biological Sciences: Prof. Maria Ida De Michelis

Application and admission: see <http://www.unimi.it/ENG/courses/29528.htm>

Student Registry office:

via Celoria, 22 - 20133 Milano

Fax 02 503.13872 - e-mail: segreteria.scienze@unimi.it

Opening time: Monday, Wednesday, Friday from 9 a.m. to 12.00 p.m.

Tuesday and Thursday from 1 p.m. to 3 p.m.

Secretariat for teaching activities:

Via Celoria, 26 (II floor, building A) – 20133 Milano

e-mail: cl.biol@unimi.it

Course location:

via Golgi 19 – 20133 Milano

via Celoria, 20-26 - 20133 Milano

Grading: The University Educational Credits.

Degree courses are structured in University Educational Credits (crediti formativi universitari – CFU). A university credit corresponds to 25 hours of work per student, time for personal study included. The average annual workload of a full time student is conventionally fixed at 60 credits.

*1 CFU equals 1 ECTS.

To obtain the credits the student must pass the final exam Min. 18/30=sufficient grade Max 30/30= excellent grade.

Bachelor program in Biological Sciences

Classification of Scholarly Field: **L-13** Biology

Degree program duration: 3 years (180 CFU)

Attendance: Mandatory

Degree coordinator: Prof. Maria Ida De Michelis

Website master program: <http://www.ccdbiol.unimi.it>

OBJECTIVES

The bachelor in Biological Sciences aims to provide students with a sound basic knowledge of the main areas of Biological Sciences and a good mastery of methodologies and technologies related to the corresponding fields of scientific research, providing adequate preparation for assimilation of scientific and technological progress and to appreciate and respect living organisms.

PROFESSIONAL OPPORTUNITIES

Graduates in Biological Sciences will be able to work in teams with a good level of autonomy and to readily enter the workplace, both in Europe and outside. They will possess adequate knowledge to perform professional activities and apply techniques in various fields, such as manufacturing activities and technological laboratories (bio sanitary, industrial, horticultural, veterinary, agro-alimentary, biotechnology, public and private research institutes) where management, analysis, classification and use of living organisms and their constituents are required.

STUDY PLAN

The lessons are taught in Italian except otherwise specified

(*Course taught also in English)

1st Year

Semester	Teaching plan: mandatory courses	CFU*
annual	Calculus	12
1st	General chemistry with elements of physical chemistry	6
1st	Cytology and histology	9
1st	English	3
2nd	Plant biology and systematics	9
2nd	Organic chemistry and chemistry laboratory	9
2nd	Physics and physics laboratory	9

2nd Year

Semester	Teaching plan: mandatory courses	CFU*
1st	Animal biology and systematics	9
1st	Biochemistry	9
1st	Biological evolution and history of biology	6
1st	Genetics *	9
2nd	Molecular biology and bioinformatics*	12
2nd	General and animal physiology*	9
2nd	Plant physiology*	9

3rd Year

Semester	Teaching plan: mandatory courses	CFU*
1st	Comparative anatomy	6
1st	Developmental biology	6
1st	Ecology	9
1st	Elements of Human anatomy, Pharmacology, Immunology	9
2nd	General microbiology	9

Free-choice courses

Students must also earn **12 credits** by freely selecting courses among those activated in the Faculty Science and Technology or in other Faculties of the University. To facilitate the selection, some of the courses consistent with the objectives of this bachelor program are listed below.

Semester	Free choice courses	CFU*
annual	Principles of professional ethics in biological laboratory	6
1st	Clinical biochemistry	6
1st	Methods in molecular biology	6
1st	Methods in applied plant biology	6
1st	Methods in experimental embryology	6
1st	Methods in plant genetics and biotechnology	6
2nd	Methods in Biochemistry	6
2nd	Methods in Cytochemistry	6
2nd	Methods in cytogenetics and human genetics	6
2nd	Methods in applied ecology	6
2nd	Methods in pharmacology and toxicology	6

The list of free-choice courses is subject to change, for information refer to "Manifesto degli studi" at <http://www.ccdbiol.unimi.it>

Semester	Other mandatory activities	CFU*
1st or 2nd	Internship in university labs	6
2nd	Final exam	3

Master in Molecular Biology of the Cell (MBC)

All the activities of this degree will be performed in English. This will guarantee full fruition of educational activities by foreigner students.

Classification of Scholarly Field: **LM-6** Biology

Degree program duration: 2 years (120 CFU)

Attendance: Mandatory

Degree coordinator: Prof Luisa Guerrini

Website master program: <http://www.ccdbiol.unimi.it>

For information: bmc@unimi.it

Course Objectives

The master degree program in Molecular Biology of the Cell is designed to provide students with the theoretic and methodological tools required to successfully tackle current research problems in the field of molecular cell biology.

In particular, it offers in-depth training in:

- molecular analysis of genomes
- gene expression control
- structure/function relationship in biological macromolecules and interactions between them in super molecular complexes and cellular communication (subdivision, signal perception and transduction, metabolic regulation).

Graduates develop solid theoretical competences through courses characterized by a strong interdisciplinary approach and gain excellent command of the latest methodologies of investigation, particularly through the accomplishment of the experimental thesis.

Career and Employment

The graduate student in BMC has a specific and in-depth knowledge in the field of molecular and cell biology, of the related analytical methodologies and experimental techniques. The graduate student will be particularly knowledgeable in the comprehension of complex biomolecular systems and of their applications to the biomedical and pharmaceutical industry as well as in their transfer to the society in relation to food, environment and cultural assets conservation.

The Master's Degree program BMC provides the necessary training to independently practice biology or to be employed in:

- basic and applied research activity in university laboratories, in other public and private research centers;
- biomedical and pharmaceutical industries, spin off and startup companies for self-directed and independent work, enabling them to hold positions of responsibility in the implementation of research projects.
- promotion and development of the scientific and technological innovation
- planning and management of industrial technologies;
- holding functions of high responsibility in the industrial, environmental, health care, and public service sectors.
- teaching biology at all levels

The acquired competences allow graduates to have open access to several sectors such as ecology and, in addition, intellectual property (patents) and business management. Moreover, the full English immersion provided by BMC, will allow graduates to perform equally well in job seeking in Italy and abroad.

STUDY PLAN

1st Year

Semester	Teaching plan: mandatory courses	CFU*
1st	Organic chemistry applied to biology	6
1st	Molecular bioinformatics	6
2nd	Advanced molecular biology	6
2nd	Protein biochemistry	6
2nd	Structural biology of the cell	6
2nd	Molecular genetics	6
2nd	English advanced	3

2nd Year

Semester	Teaching plan: Mandatory course	CFU*
annual	Biomolecular methods laboratory	9

The student must acquire **18 credits** from the courses listed below:

Semester	Teaching plan: a course to be chosen between:	CFU*
1st	Biomenbranes	6
1st	Molecular pharmacology and immunology	6
1st	Functional genomics	
1st		
	Teaching plan: a course to be chosen between	
1st	Developmental biology and genetics	6
1st	Molecular microbiology and genetics of microorganisms	6
	Stem cells and genetic diseases	
	Teaching plan: a course to be chosen between	
2nd	Methods in biochemical investigation	6
2nd	Signal transduction*	6
1st	Signal transduction	

Free-choice courses

The student must acquire **12 credits** freely choosing between all the teachings activated by the University, provided culturally consistent with his training and not overlapping in content, to the fundamental and optional teachings already used in the study plan. Obviously, as free choice courses, the student can pick the remaining mandatory and/or guided-through course that he/she had not inserted in the study plan. If not available in English, free choice courses can be taken in Italian. Six out of 12 CFU can be acquired by an internship of 150 hours in a University and/or a private (Industry, Hospital, others) lab

Master in Biology Applied to Research in Biomedicine (BARB)

Classification of Scholarly Field: **LM-6** Biology

Degree program duration: 2 years (120 CFU)

Attendance: Mandatory

Degree coordinator: Prof. Mirko Baruscotti

Website master program: <http://www.ccdbiol.unimi.it>

Course Objectives

The master degree program in Biology Applied to Research in Biomedicine is designed to offer graduates a sound theoretical understanding of the biological processes that underpin the physiology of organs and systems, and their pathological dysfunctions and modulation on a pharmacological basis, particularly in human beings.

It also offers training in the application of the key concepts, bio-health considerations and aspects relating to the relationship between humans and the environment, providing graduates with the tools required to apply this knowledge through experience of modern laboratory practice and the completion of an experimental thesis.

In particular, the master's degree program sets out to provide students with the tools required to ensure continuous modernization in the field of biomedical research through the use of flexible teaching methods based on the provision of monographic courses.

The master's degree program is specifically targeted at training graduates to adopt a critical, constructive approach to the most advanced knowledge in human biology research.

Career and Employment

Graduates in Biology Applied to Research in Biomedicine can enter roles in the laboratories of public and private bodies engaged in biomedical research at both a European and extra-European level, including universities, hospitals, research centers, local bodies, pharmaceutical firms.

They can also engage in the development of new biomedical and bio-health technologies in industries in the field, and assume positions of responsibility in the organization of work in public and private analysis laboratories.

STUDY PLAN (*Course taught in English)

1st Year

Semester	Teaching plan: mandatory courses	CFU
1st	Human anatomy and neuroanatomy	6
1st	System pharmacology	6
1st	Pathology	6
1st	Principles of physiology	6
2nd	Molecular biology applied to the biomedical research	6
2nd	Epidemiologic and preventive sciences	6
2nd	English advanced	3

The student must acquire **18 credits** (3 courses) from the courses listed below:

Semester	Teaching plan	CFU
1st	Cellular and molecular physiology	6
1st	Cellular and molecular pathology	6
1st	Techniques for advanced biomedical research	6
2nd	Clinical molecular biology	6
2nd	Ecotoxicology	6
2nd	Cellular and molecular pharmacology	6
2nd	Physiology and pharmacology of the endocrine system	6
2nd	Clinical microbiology and hygiene	6
2nd	Neurophysiology	6

The student must acquire **12 credits** (2 courses) from the courses listed below:

Semester	Teaching plan	CFU
2nd	Biochemistry of signal transduction and membrane biophysics*	6
2nd	Differentiation biology and cell therapies	6
2nd	Human and molecular genetics	6
2nd	Cellular and molecular microbiology *	6

Free-choice courses

The student must acquire **12 credits** freely choosing between all the teachings activated by the University, provided culturally consistent with his training and not overlapping in content, to the fundamental and optional teachings already used in the study plan. The student can also choose between the optional unused teachings of BARB master.

Semester	Teaching plan: optional course	CFU
1st	Cellular, molecular and functional approaches to genetic diseases	6

2nd Year

Semester	Mandatory activity	CFU
annual	Internship and final exam	39

Master in Biodiversity and Evolutionary Biology (BIOEVO)

Classification of Scholarly Field: **LM-6** Biology

Degree program duration: 2 years (120 CFU)

Attendance: Mandatory

Degree coordinator: Prof. Claudio Bandi

Website master program: <http://www.ccdbiol.unimi.it>

Course Objectives

The master degree program in Biodiversity and Evolutionary Biology is designed to provide graduates with specific, up-to-date training in the field of organismic biology, offering them a comprehensive understanding of organisms that takes full account of their structural and functional complexity and evolutionary context.

The curriculum presents the central questions of animal and plant biodiversity and evolution through a particular focus on structural and functional adaptations, reproductive and development processes, behavioral aspects, interactions between organisms and environment, and issues associated with evolutionary biology.

The course proposes an integrated, comparative multidisciplinary approach and provides students with an in-depth understanding of the latest analytical, technical and instrumental methodologies, which vary depending on the specific topics selected for the experimental thesis.

Career and Employment

The program in Biodiversity and Evolutionary Biology provides graduates with an excellent command of scientific methodology and the ability to work autonomously and to achieve positions of responsibility and management, offering indispensable support in a wide range of areas of work (scientific research, conservation and protection of organisms and environment, environmental monitoring, publishing and diffusion of scientific knowledge) which require in-depth knowledge of the biological phenomena including adaptations of animals and plants, and excellent training in the protection of biodiversity and the correct handling and use of living organisms.

STUDY PLAN

1st Year

Semester	Teaching plan: mandatory courses	CFU*
2nd	Deontology and bioethics	6
2nd	English advanced	3

The student must acquire **6 credits** (1 course) from the courses listed below:

Semester	Teaching plan	CFU*
1st	Environmental and applied botany	6
1st	Ethology	6

The student must acquire **6 credits** (1 course) from the courses listed below:

Semester	Teaching plan	CFU*
1st	Biogeography	6
2nd	biodiversity and evolution	6

The student must acquire **6 credits** (1 course) from the courses listed below:

Semester	Teaching plan	CFU**
2nd	Biomechanics	6
2nd	Symbiosis and parasitism	6

The student must acquire **24 credits** (4 courses) from the courses listed below provided they are not already selected:

Semester	Teaching plan	CFU*
1st	Biogeography	6
1st	Population biology and genetics	6
1st	Environmental and applied botany	6
1st	Comparative endocrinology	6
1st	Ethology	6
1st	Photobiology and bioenergetics	6
1st	Reproductive strategies	6
2nd	Biodiversity and evolution	6
2nd	Biology of animal development	6
2nd	Plant developmental biology	6
2nd	Marine biology and ecology	6
2nd	Biomechanics	6
2nd	Ecotoxicology	6
2nd	Symbiosis and parasitism	6

The student must acquire **12 credits** (2 courses) from the courses listed below:

Semester	Teaching plan	CFU*
1st	Mathematical modeling in evolutionary and environmental biology	6
2nd	Human functional biology	6
2nd	History and phylosophy of sciences	6

Free-choice courses

The student must acquire **12 credits** freely choosing between all the teachings activated by the University, provided culturally consistent with his training and not overlapping in content, to the fundamental and optional teachings already used in the study plan. The student can also choose between the optional unused teachings of BIOEVO master.

2nd Year

Semester	Mandatory activity	CFU*
annual	Internship and final exam	45

Master in Biology Applied to Nutritional Sciences (BIONUTRI)

Classification of Scholarly Field: **LM-6** Biology

Degree program duration: 2 years (120 CFU)

Attendance: Mandatory

Degree coordinator: Prof. Alessandro Aliverti

Website master program: <http://www.ccdbiol.unimi.it>

Course Objectives

The degree program in Biology Applied to Nutrition Sciences forms professional figures endowed with advanced expertise in the following areas: biological applications in the field of nutrition; interaction between food and environment; food resource hygiene and quality; control procedures; and food certification.

As a consequence of the biological training they have received in the field of nutrition, graduates are competent to handle problems arising from the rapid evolution constantly occurring in the environmental, cultural, regulative and technological aspects of nutrition. This degree program aims to respond to the growing demand of new competences in the field of bio-nutrition, which, while traditionally associated with the professional figure of the biologist, is now under constant expansion and evolution.

Career and Employment

Graduates in this master can be engaged in:

- Research activities in the field of bio-nutrition
- Research activities in the food industry and in specific sectors related to public health promotion.
- Activities related to food resource optimization, conservation and safety processing.
- Activities related to control, accreditation and certification procedures in public and private facilities and laboratories, in compliance with European regulation..
- Marketing in the pertinent commercial fields.
- Management positions in public and private laboratories.
- Freelance activities in related sectors (e.g. nutritional consultancy for the development of optimal diets for communities and individuals).
- Managerial positions in the field of large-scale food distribution.
- Knowledge transfer in the field of bio-nutrition, for institutional operators or the general population.

STUDY PLAN

1st Year

Semester	Teaching plan: mandatory courses	CFU*
annual	Biological modeling of nutrition	9
annual	Nutrigenomics, nutrिमicrobiomics	6
1st	Structural and functional bases of nutrition	9
1st	Nutritional biochemistry	6
1st	Food and fermentation chemistry	6
2nd	English advanced	3

2nd Year

Semester	Teaching plan: : mandatory courses from 2015-2016	CFU*
annual	Applications in food sciences	9

The student must acquire 6 **credits** (1 course) from the courses listed below:

Semester	Teaching plan	CFU*
2nd	Legislation, law and business organization	6
2nd	Methodologies in nutrition sciences	6

The student must acquire 6 **credits** (1 course) from the courses listed below:

Semester	Teaching plan	CFU*
1st	Certification, control, quality and hygiene of foods	6
2nd	Molecular and cellular bases of metabolic and nutritional diseases	6
2nd	Nutrition, pharmacology and toxicology	6

The student must acquire 6 **credits** (1 course) from the courses listed below:

Semester	Teaching plan	CFU*
2nd	Eco-ethology of nutrition	6
2nd	Nutrition ecology and ecotoxicology	6
2nd	Nutrition and life cycles	6
2nd	Foods resources	6

Free-choice courses

Students must acquire **12 credits** freely chosen between all the courses activated by the University, provided they are culturally consistent with the degree program and do not present overlaps with the contents other formation activities. Students may also choose between the optional unused courses of BIONUTRI master.

Semester	Teaching plan: optional course	CFU*
2nd	Science Communication	6

2nd Year

Semester	Mandatory activity	CFU*
annual	Internship and final exam	42

CONTACTS:

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Degree Coordinator for Master in Biology Applied to Nutritional Sciences
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Welcome Desk

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