UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2025/26
IN
MOLECULAR BIOLOGY OF THE CELL (Class LM-6)
Enrolled from 2015/2016 to 2024/2025 academic year

HEADING

Degree classification - Denomination and code:	LM-6
Degree title:	Dottore Magistrale
Length of course:	2 years
Credits required for admission:	180
Total number of credits required to complete programme:	120
Course years currently available:	2nd
Access procedures:	open, subject to entry requirements
Course code:	F9Y

PERSONS/ROLES

Head of Study Programme

Prof.ssa Isabella Dalle Donne

Degree Course Coordinator

Prof. Paolo Pesaresi (mbc.coordinatore@unimi.it)

Tutors - Faculty

Academic guidance advisors - Marta Valenza and Federica Marini
Erasmus and International Mobility advisors - Cristina Bonza and David Horner
Study plan advisor - Monica Beltrame
Thesis advisors - Paolo Pesaresi, David Horner
Master's Degree admission advisor - Paolo Pesaresi
Credit recognition advisor - Paolo Pesaresi

Degree Course website

http://mbc.cdl.unimi.it

Academic Services Office

Address: via Celoria, 26, 20133 Milan – ground Floor, Tower C https://informastudenti.unimi.it/saw/ess?AUTH=SAML

International Students Office

Address: via S. Sofia, 9/1, Milan. http://www.unimi.it/en/international/coming-abroad/international-students-office-welcome-desk

Matriculation and enrollment

http://www.unimi.it/en/study/bachelor-and-master-study/degree-programme-enrolment/enrolment-masters-programme

MBC email

Email: mbc.coordinatore@unimi.it

Representative for disability services and specific learning disabilities (appointed by the Academic Board)

Prof. Diletta Dolfini Email: diletta.dolfini@unimi.it

Student Desks

Address: via Celoria, 18, 20133 Milan. Tel. 0250325032 https://www.unimi.it/en/node/360 https://www.unimi.it/en/node/359

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The MBC course covers all principal areas of the LM-6 Biology course, with a unique focus on biomolecular subjects that distinguishes it from other courses of the same LM Class. The main goal of the MBC course is to train biologists in advanced biomolecular research, to address present and future scientific challenges.

In-depth and up-to-date knowledge will be provided for the following subjects: molecular analysis of the genome; regulation of gene expression; structure and function of biological macromolecules and their interactions in supramolecular complexes; cellular communication, signal perception and transduction, metabolic regulation, biomolecular engineering, bioinformatics and biostatistics. Both theoretical and practical aspects of biomolecular research will be addressed. Graduate students will learn to apply novel and emerging research technologies/approaches, cutting-edge data acquisition systems and analysis, and will have hands-on experience with top-level nanotechnology, hosted in the research laboratories of the DBS. MBC graduates will be well-equipped to enter further, postgraduate-level education programmes as well as R&D departments of different biotech companies.

Expected learning outcomes

According to the Dublin Descriptors, expected learning outcomes are:

KNOWLEDGE AND UNDERSTANDING. Comprehensive knowledge in specific areas of molecular and cellular biology: protein biochemistry, microbiology and genetics, biomedicine and bioinformatics.

APPLYING KNOWLEDGE AND UNDERSTANDING. The student will gain:
- Expertise in carrying out research in the fields of molecular and cell biology, genetics and microbiology and in related research areas, e.g. chemistry, biomedicine and bioinformatics.
- Analytical skills to investigate complex bio-molecular systems using state-of-the-art techniques and instrumentation.
- Competences in experimentally-derived data analysis and interpretation, including biostatistics.
- Learning up-to-date methodologies for biological analysis and data processing; the development of interpretative models will be assessed throughout the Master's thesis.
- Training and awareness of bio-safety aspects and the appropriate procedures for chemical waste management, and knowledge of related laws and regulations.

DECISION-MAKING. The student will acquire skills in:
- Critical evaluation of research data, e.g. data interpretation and identification of the appropriate logical approach and methodological strategies to gain further experimental and theoretical knowledge during research development.
- Experimental planning, including time management and the application of appropriate scientific methods to different biomolecular problems.
- Development of innovative research strategies.
- Critical analysis of scientific literature and data.
- Awareness of ethical aspects of scientific research and responsibility

COMMUNICATION SKILLS. The student will gain experience in:
- Scientific dissemination and the ability to adopt an appropriate use of scientific English, in order to communicate with both specialist and non-specialist audiences.

LEARNING SKILLS. The student will:
- Receive adequate training to become autonomous in his/her scientific thinking, planning and professional development, and he/she will acquire competences in the independent management of his/her research projects and related team working skills.
- Build strong foundations in order to understand the continuous technological advances in general or specialist areas of molecular and cellular biology.

All above-mentioned skills will be gained through attending lectures, independent study, and through an experimental internship that will lead to the preparation of the final dissertation. The achievement of course-specific educational goals will be assessed:
- by regular written and/or oral exams
- during the experimental thesis, assessed by continuous discussion of research progress/results with the scientific team and tutor.
- by the thesis committee who will assess overall presentation skills and the ability to proficiently write and discuss his/her work in proper scientific terms.

Professional profile and employment opportunities

The MBC graduate will acquire specialized and in-depth knowledge in molecular and cellular biology, and consolidated competences in the application of state-of-the-art analytical methodologies and experimental techniques to address a variety of biological challenges. This highly specific, yet multidisciplinary, profile will offer MBC graduates professional employment opportunities in both the public and private sectors, operating in biology-and biotechnology-related fields. In particular, MBC will provide the necessary training to allow graduate employment in the following sectors:
- basic and applied academic research, in universities and other public/private research centers;
- environmental management /protection sectors;
- biomedical, agro-bio and pharmaceutical industries, and related professional sectors;
- promotion and development of innovative scientific technologies;
- biotechnological research and development in the healthcare, pharmaceutical and food industries
- editorial, intellectual property and scientific dissemination sectors;

- project management in the biotech industry;
- Biology teaching in adherence to Italian laws;
The fact that MBC is carried out entirely in English, will allow graduates to engage with public/professional sectors in both a national and international setting.

MBC graduates may take the state exam for the qualification to practice the profession of biologist and consequently may be legally admitted to the 'A Section' of the National Biologists Register. Furthermore, graduates will be fully qualified to apply for entry to national/international Ph.D. courses and other postgraduate specializations. Indicatively, the different employment sectors accessible to Master graduates, with reference to the intellectual, scientific and highly-specialized professions are here-listed:
- Biologists and related professionals
- Molecular biologist
- Researchers and technicians graduated in the area of biological sciences (after passing the competitive exam).

Pre-requisites for admission

QUALIFICATIONS AND KNOWLEDGE REQUIRED FOR ADMISSION
The admission to the MBC course is subjected to curricular requirements and a demonstrated background knowledge in suitable disciplines related to the course (DM 270/04). Admission is open to:
- Graduates in Biological Sciences (Class L-13) from any Italian University that follows CBUI rules, as adequately certified. In this case, credits (CFU or ECTS) acquired by the candidate as an undergraduate will be fully recognized and will meet the curricular prerequisites. The CBUI guidelines describe the compulsory SSD (scientific areas) and the related recommended number of CFUs (min-max): 66-96 CFUs in biological subjects (BIO/01, BIO/02, BIO/04, BIO/05, BIO/06, BIO/07, BIO/09, BIO/10, BIO/11, BIO/18, BIO/19); 12-15 CFUs in chemistry-based subjects (CHIM/01, CHIM/02, CHIM/03, CHIM/06); 15-18 CFUs in mathematics/physics and computer science subjects (MAT/01-09, FIS/01-08 e INF/01).
- Biological Sciences (Class L-13) graduates from Universities that do not follow CBUI guidelines, Biological Sciences (Class L-12) ex DM509/99, or any other class that meet suitable curricular requirements, including graduates from foreign Universities that possess a title equivalent to the 1st level degree in Italian law. Curricular requirements are the acquisition of a minimum of 93 CFUs distributed in equivalent scientific areas (SSD), as described above, for Biological Sciences (Class L-13) that are in line with the criteria set by CBUI.

Programme structure

The MBC Master’s has a duration of two years, each year is subdivided into two semesters.
120 educational credits (CFU) are required for Master completion. Each credit corresponds to a standard student workload of 25 hours, including:
- 8 hours of lectures followed by 17 hours of individual study;
- 16 hours of practical labs followed by 9 hours of individual study;
- 25 hours of training activities related to the thesis internship.

The curriculum includes mandatory, guided-and elective courses. Subject choices are made as follows:
- 7 mandatory courses (45 CFUs in total);
- 3 guided-choice courses on principal subjects (18 CFUs in total);
- 2 elective courses (12 CFUs in total), which may be freely selected by the student from all the courses offered by the University (including the MBC courses in the guided-choice list, which have not already been selected), provided that they are coherent with the study plan. MBC recommends to select elective courses with a specific focus on biostatistics and bioinformatics. If unavailable in English, elective courses may be taken in Italian if the student is proficient in the Italian language.

During the first year (I and II semesters), students are encouraged to acquire credits by following at least 8 distinct courses. 3 CFUs will be assigned for English language skills.
The second year will center around the experimental research activities related to the thesis consisting of 12 CFUs of initial laboratory training and 30 CFUs related to the final thesis exam.

Study plan definition and submission for approval
The study plan should be coherent with all proposed MBC courses and in line with the experimental thesis topic. The study plan must be submitted online in the 1st Year, via the web address https://mbc.cdl.unimi.it/en/study/study-plansubmission, within the deadline set by the Student Administrative Office. Approval of the study plan by the Academic Board (Collegio Didattico Dipartimentale, CDD) is mandatory. To favour the correct planning of educational activities, students are encouraged to discuss their study plan with the tutors during the first year and/or contact the Academic Service Office, at the DBS (ground Floor, Tower C).
Study plans including courses that differ from those suggested in the Progreamme Description (Manifesto degli Studi) must receive prior positive evaluation by the Study Plan Committee (Commissione Piani di Studio) and must be approved by the Academic Board.
In addition, students are invited to consider the activities included in the University project for the development of soft skills: https://www.unimi.it/en/study/bachelor-and-master-study/following-your-programme-study/soft-skills
If interested, the soft skills courses must be included in the study plan, they are of compulsory attendance, they have a defined number of places and they can only be selected by the students if they have been subscribed by the Master's degree

program to which students belong. https://mbc.cdl.unimi.it/en/courses

Only courses that account for the requested CFU are acceptable. Students taking elective courses not offered by MBC Master are requested to submit a study plan by email to the Study Plan Advisor (monica.beltrame@unimi.it) for approval by the end of January of the first year.

Admission to graduation depends on correlation between the list of passed exams and the last approved official study plan. In the event of discrepancies between the student's educational career and the relevant study plan, the student cannot be admitted to graduation.

Lecture timetable
The complete course timetable will be posted at the following address http://mbc.cdl.unimi.it/en/study/course-timetable.

Testing and assessment procedures
University credits will be earned through exams and assessment of lectures, laboratories and thesis dissertation. Course grades are calculated on a 30-point scale, with grade/mark 18 being the minimum to pass and obtain course credits. Assessment will consist of oral or written exams as clearly stated in the syllabus of each course. For courses structured into modules, a head lecturer will be identified as the coordinator, and evaluation procedures, and the registration of examination grades, will be agreed by all associated teaching members.
The schedule of the examination sessions for the assessment of the learning outcomes is available through the UNIMIA - exams registration online service (available at http://mbc.cdl.unimi.it/en/study/exams). For each course, at least 7 sessions per year are scheduled, during January-February, June-July, September.

Procedures for exam registration and admittance
Exam registration is compulsory and must be carried out through the UNIMIA - exams registration online service (available at http://mbc.cdl.unimi.it/en/study/exams) in order to allow CFUs to be automatically accredited to the student's personal record.
Students may only sit exams during course breaks, when teaching activities are suspended.

Conscientious objection policy

During the MBC Master, the use of animals for teaching purposes is forbidden, according to law: art. 5f of the Legislative Decree 26/2014. Such procedures are allowed during the traineeships for thesis preparation. However, they must be carried out exclusively by authorized staff, to whom the Legislative Decree 26/2014 does not apply. According to Italian law n. 413, October 12 1993, "Norme sull'obiezione di coscienza alla sperimentazione animale", students have the uncontestable right to conscientiously object to their participation in any animal experimentation. In this case, the Teaching Board will suggest alternative traineeships, that are consistent with the educational goals of MBC, to ensure the correct acquisition of the study credits necessary to graduate.

Campus

Classrooms are located in the University buildings in: Via Celoria, 26 (Biology buildings); Via Celoria, 20 (Teaching Sector); Via Golgi, 19. Most laboratories are located in the Department of Biosciences, Via Celoria 26, 20133 Milano.

Libraries

The Biology, Chemistry, Physics and Computer Science library is located in Via Celoria, 18, Milano. See: http://www.sba.unimi.it/en/libraries/13453.html

Tutoring

Tutors will provide students with academic advice, guidance on their course choices and advice on where and how to seek help with personal issues.

Core / compulsory activities

All above-mentioned training activities, including mandatory, guided and elective courses, and research thesis activities, are compulsory for completing the MBC Master'.

Language test / computer literacy test

In order to obtain their degree, students must be proficient in English at a B2 level under the Common European Framework of Reference for Languages (CEFR). This proficiency level may be certified as follows:
- By submitting a language certificate attesting B2 or higher level in English and issued no more than three years before the date of submission. You will find the list of language certificates recognized by the University at: https://www.unimi.it/en/node/39322). The certificate must be uploaded during the enrolment procedure, or subsequently to the portal http://studente.unimi.it/uploadCertificazioniLingue;
- By taking a placement test offered by the University Language Centre (SLAM) between October and January of the first year. Students who fail the test will be required to take a SLAM course.
The placement test is mandatory for all those who do not hold a valid certificate attesting to B2 or higher level.
Those who have not taken the placement test by the end of January or fail the end-of-course exam six times must obtain the necessary certification privately before graduating.

Compulsory attendance

Course attendance is strongly recommended.

Internship criteria

THE THESIS

The Master's thesis is composed of a dissertation (written in English) and reports the research activities performed by the student during the 2nd year thesis in a research laboratory, under the guidance of a supervisor (Relatore) and a co-tutor (Correlatore). The thesis describes original data generated on a given research subject, adherent to the principal disciplines of MBC. The thesis period lasts about one solar year and normally starts at the beginning of the second year. In the first part of this period (about 2-3 months) the students will become acquainted with the methodologies and investigation techniques that are mandatory to properly collect research data. During this period the students will carry out practical hands on activities under the constant supervision of a trained senior researcher. At the end of this period upon positive written approval by the MBC coordinator and supervisor of the thesis project the student may start his/her research project in an autonomous manner.

Compilation theses are not permitted. Master theses may be internal or external. Internal theses are carried out at the DBS or in other Departments of the University, in which MBC and DBS teaching staff are based.

External experimental theses may be carried out in other public or private Institutions with adequate facilities. Authorization to perform an external thesis is given by the Academic Board, after careful evaluation of the proposed thesis subject and of the quality of the proponent laboratory. To apply for an external thesis, the student must follow the rules indicated at https://mbc.cdl.unimi.it/en/study/stage-and-internship. The application must be submitted well in advance, as it requires the approval of the MBC Coordinator. The Supervisor of an external thesis must be a member of the DBS and of the Academic Board.

HOW TO SELECT AND APPLY FOR A THESIS POSITION

In April of the first year and October of the second year, students will be informed of the research areas offered in potential host laboratories, the starting dates and the number of internships available are posted on the website (http://tesi.bioscienze.unimi.it). Informative open-labs are held in the second semester of the first year and the first semester of the second year to present the research interests of the DBS groups and application modalities. Teaching members will communicate place acceptance to students and the MBC coordinator, by a set deadline. The thesis officially starts upon submission of the appropriate form to the Student information office (via Celoria, 26–2nd floor, tower A).

The MBC Coordinator will ensure that every student is assigned a placement. The Coordinator will supervise the acceptance procedures of the external thesis by the thesis committee and will also assist the student to identify a Supervisor. The Supervisor must meet the student periodically and to critically evaluate his/her work progress.

The Supervisor is responsible for the quality of the experimental work performed by the student and will decide if the student may present his/her thesis in the final exam. The thesis must state on the front page where the internship has been carried out (https://mbc.cdl.unimi.it/en/study/stage-and-internship).

ADMITTANCE TO GRADUATION EXAM

The student is admitted to the graduation exam upon certified completion of:

1) the requested mandatory, guided-choice, and elective courses and acquisition of the required number of CFUs, including 3 CFUs relating to English B2 level certification and 12 CFUs of laboratory training;

2) the final thesis.

Degree programme final exam

The MBC Master will be obtained by passing a final assessment, which is based on evaluation of the thesis dissertation and an oral presentation (both in English) that describes the research project performed by the student. Following the oral presentation, carried out in front of the thesis committee and a public audience, the student will be questioned by the thesis committee on scientific aspects related to the presented work. The committee will evaluate the student's personal contribution to the design and experimental content of the thesis research project, the written (thesis dissertation) and oral thesis presentation skills, as well as the ability to answer to the questions posed by the thesis committee, together with the student's overall performance throughout the two-year Master's, before awarding a grade, calculated on a 110 - point scale. More details on the web page: https://mbc.cdl.unimi.it/en/study/graduating. The awarded degree title is a Master's Degree in Molecular Biology of the Cell.

EXPERIENCE OF STUDY ABROAD AS PART OF THE DEGREE PROGRAM

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment.

The agreements entered into by the University with over 300 universities from the 27 EU member countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organizations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

Study and internships abroad

MBC students are given the opportunity to spend part of their curriculum abroad, at a University within the European Union (EU), in the context of the Erasmus+ program of the European Commission. Students can attend courses and sit exams that

can be included in the core curriculum and/or perform their practical thesis in several European Universities localized in North Europe (Norway, Denmark, Netherlands), France, Germany, Ireland and Iberian Peninsula (see https://dbs.unimi.it/it/rapporti-internazionali/mobilita-internazionale). Most of the Northern European Universities offer courses taught in English. The Erasmus+ call is released each year, usually in February. More information can be found at https://www.unimi.it/en/international/study-abroad/studying-abroad-erasmus; .
Accepted students must present a study plan that reports all the activities he/she intends to perform abroad, detailing the corresponding CFUs; the number of proposed CFUs should approximately correspond to those the student would have achieved over the same time period in his/her university. The proposed Erasmus+ program study plan, must be coherent with the MBC course content and must be evaluated and approved by the Academic Board. If necessary, the Academic Board may request the student to integrate the program of exams taken abroad. In accordance with the rules established by the Academic Senate, following completion of the Erasmus+ program, approved exams will be registered, possibly with the original denomination, as part of the student's curriculum, upon the conversion of the European Credit Transfer and Accumulation System (ECTS) into CFUs.
If the student performs the experimental thesis work abroad, he/she must follow the rules outlined above (see Internship criteria and Rules for the thesis and final exam).
The Erasmus and international mobility advisors for Biological area are prof. M. Cristina Bonza (cristina.bonza@unimi.it) and prof. David Horner (david.horner@unimi.it).

How to participate in Erasmus mobility programs

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.
Ad hoc commissions will evaluate:
• Academic career
• the candidate's proposed study programme abroad
• his/her foreign language proficiency
• the reasons behind his/her application

Call for applications and informative meetings
The public selection for Erasmus+ mobility for study generally begins around February each year with the publication of a call for applications specifying destinations and requirements. Regarding the Erasmus+ Mobility for Traineeship, the University of Milan usually publishes two calls a year enabling students to choose a destination defined by an inter-institutional agreement or to find a traineeship position on their own.
The University organizes informative meetings to illustrate mobility opportunities and rules for participation.

Erasmus+ scholarship
The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which may be supplemented by the University funding for disadvantaged students.

Language courses
Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University Language Centre (SLAM).
https://www.unimi.it/en/node/8/
Learn more at https://www.unimi.it/en/node/274/

For assistance, please contact:
International Mobility Office
Via Santa Sofia 9 (second floor)
Tel. 02 503 13501-12589-13495-13502
Contacts: InformaStudenti; mobility.out@unimi.it
Student Desk booking through InformaStudenti

ADMISSION CRITERIA: 1ST YEAR OPEN, SUBJECT TO ENTRY REQUIREMENTS

N° of places reserved to non-EU students resident abroad

25

1st COURSE YEAR (Cancelled since academic year2025/26)Core/compulsory courses/activities

Scheduling	Learning activity	Module/teaching unit	Ects	Sector
	English proficiency B2 (3 ECTS)		3	NN
	Advanced molecular biology		6	BIO/11
	Molecular bioinformatics		6	INF/01
	Organic chemistry applied to biology		6	CHIM/06
	Molecular genetics		6	BIO/18
	Protein biochemistry		6	BIO/10
	Structural biology of the cell		6	(3) BIO/06, (3) BIO/01
		Total number of compulsory credits/ects	39	

2nd COURSE YEAR Core/compulsory courses/activities				
Scheduling	**Learning activity**	**Module/teaching unit**	**Ects**	**Sector**
year	Biomolecular methods laboratory		9	(3) BIO/11, (3) BIO/10, (3) BIO/18
year	Laboratory training		12	NN
		Total number of compulsory credits/ects	21	
Further elective courses				
The student must choose one of the following three courses:				
	Developmental biology and genetics		6	BIO/18
	Functional genomics		6	(1) BIO/11, (5) BIO/18
	Molecular microbiology and genetics of microorganisms		6	(5) BIO/19, (1) BIO/18
The student must choose one of the following three courses:				
	Biomembranes		6	BIO/09
	Molecular pharmacology and immunology		6	(3) MED/04, (3) BIO/14
	Stem cells and genetic diseases		6	BIO/14
The student must choose one of the following four courses:				
	Synthetic biology		6	(2) BIO/11, (1) BIO/10, (1) BIO/19, (1) BIO/18, (1) BIO/04
	Biostatistics		6	(3) BIO/11, (3) BIO/18
	Methods in biochemical investigation		6	BIO/10
	Signal transduction		6	(3) BIO/10, (3) BIO/04
The student must acquire 12 CFU by selecting any of the courses offered by the University of Milan, provided that they are coherent with MBC topics and that the course content does not overlap with those present in mandatory and guided-choice courses. Obviously, as open choice courses, the student can pick the remaining guided-choice courses that he/she had not inserted in the study plan. MBC recommends to select elective courses with a specific focus on bioinformatics. If unavailable in English, open-choice courses can be taken in Italian provided that the student is fluent in Italian language.				
End of course requirements				
	Final dissertation		30	NN
		Total number of compulsory credits/ects	30	

COURSE PROGRESSION REQUIREMENTS

There are no propaedeutic courses in the MBC programme that limit progression from the first to the second year.

VALIDATION OF ECTS ACQUIRED IN OTHER/PREVIOUS DEGREE PROGRAMMES/ THROUGH PROFESSIONAL EXPERIENCE

Validations of previously acquired ects

CFU ACQUIRED IN OTHER MASTER'S

Students requesting a transfer from another Master's programme to MBC, will be subject to audit by an ad hoc committee that will decide if and how many of the CFUs previously acquired by the student may be deemed valid upon admittance to MBC. In addition, the Academic Board retains the right to assess the background knowledge of the candidate by interview, or may request partial integration of pertinent exams.

CFUs ACQUIRED DURING PROFESSIONAL WORK EXPERIENCE

A maximum of 12 (extracurricular) CFUs may be acquired (according to art. 5, comma 7, del DM 270/2004) by certified professional work experience and by post-secondary level educational activities performed in association with the University, upon approval by the MBC coordinator.