



**UNIVERSITA' DEGLI STUDI DI MILANO**  
**PROGRAMME DESCRIPTION - ACADEMIC YEAR 2019/20**  
**IN**  
**MOLECULAR BIOLOGY OF THE CELL (Class LM-6)**  
**Enrolled from 2015/2016 academic year**

### **HEADING**

<b>Degree classification - Denomination and code:</b>	LM-6
<b>Degree title:</b>	Dottore Magistrale
<b>Length of course:</b>	2 years
<b>Credits required for admission:</b>	180
<b>Total number of credits required to complete programme:</b>	120
<b>Course years currently available:</b>	1st , 2nd
<b>Access procedures:</b>	open, subject to entry requirements
<b>Course code:</b>	F9Y

### **PERSONS/ROLES**

#### **Head of Study Programme**

Prof. Mirko Baruscotti

#### **Degree Course Coordinator**

Prof.ssa Luisa Guerrini (luisa.guerrini@unimi.it)

#### **Tutors - Faculty**

Profs. Lucia Colombo, Martino Bolognesi, Anna Moroni, Marco Muzi Falconi

#### **Degree Course website**

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

#### **Matriculation and enrollment**

<http://www.unimi.it/ENG/admission/92320.htm>

#### **MBC email**

Email: [bmc@unimi.it](mailto:bmc@unimi.it)

#### **Student administrative office**

via Celoria, 22. Tel. (0039) 199188128/From abroad: 0039 056676357. Students Information Service:

<http://www.unimi.it/ENG/student/52904.htm> E-mail: [www.unimi.infostudente.it](http://www.unimi.infostudente.it)

#### **Student information office**

Via Celoria, 26 – 2nd floor, tower A Opening times: from Monday to Friday, 10-11:45 <http://www.cdbiol.unimi.it> Email: [cl.biol@unimi.it](mailto:cl.biol@unimi.it)

### **CHARACTERISTICS OF DEGREE PROGRAMME**

#### **Introduction**

The Department of Biosciences (DBS) at the Università degli Studi di Milano is the reference point and the main Institution responsible for the MBC Master Degree course.

#### **General and specific learning objectives**

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

An in-depth and up-to-date knowledge will be provided for the following subjects: molecular genome analysis; 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 and computing. 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 perfectly suited for entering a PhD school for advanced education.

## 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. These subjects, previously introduced during the bachelor degree program, are studied in depth in the Master degree program.

**APPLYING KNOWLEDGE AND UNDERSTANDING.** Skills to address complex issues and to carry out research activities in the specific fields of molecular and cell biology, genetics and microbiology and in related areas of research in chemistry, biomedicine and bioinformatics. Skills to carry out analysis and characterization of complex bio-molecular systems by using innovative procedures and state-of-the-art instruments. Skills to rationally and systematically interpret data obtained from laboratory observations and measurements. Learning up-to-date methodologies for biological analysis and data processing; the development of interpretative models will be assessed throughout the duration of the experimental work involved in the Master thesis and during the writing of the dissertation. Profound knowledge and awareness of bio-safety, the appropriate procedures for chemical waste management, and of existing laws and regulations, will also be acquired.

**DECISION-MAKING.** Acquiring independent judgment regarding: interpreting experimental data and mastering the appropriate tools in relation to different scientific and technical disciplines; designing and implementing complex experiments, by managing time and procedures; assessing and quantifying final outcomes; directing projects, structures and personnel; identifying new perspectives and innovative development strategies; evaluating, interpreting and revising literature research data; professional deontology; ability to formulate analytical problems and to propose ideas and innovative solutions; information-retrieval skills, in relation to primary and secondary information sources, including information retrieval and evaluation on chemical topics through on-line computer searches.

**COMMUNICATION SKILLS.** Skills to comprehensively communicate research results, conclusions and related knowledge and rationale, to specialist and non-specialist audiences in molecular and cell biology. Ability to communicate accurately and fluently in English with foreign partners.

**LEARNING SKILLS.** Acquiring adequate skills for the development and improvement of competences in a self-directed and independent way, in relation to the ability to conduct on-line literature searches by accessing databases and online information. Achieving competence in the use of all instruments and methodologies, which allow personal knowledge to be continuously updated. Such skills that include the identification of specific information both in the area of molecular and cell biology (specialized texts, scientific journals etc.) and in related and complementary disciplines (also of legal and/or economic character), are essential for the management of complex projects.

The skills listed above will be achieved through lectures, guided and independent study and through an extended period of laboratory internship for the preparation of the final dissertation. The achievement of course-specific educational goals will be assessed: through regular written and/or oral exams; during the experimental thesis work and writing the dissertation; by evaluating students' awareness and participation in the educational activities and critical thinking skills. The evaluation commission at the final dissertation will also assess the skills of the student in presenting, explaining and discussing his/her work in proper scientific terms.

## Professional profile and employment opportunities

The MBC graduate will have acquired has specialized and extensive knowledge in the field of molecular and cell biology, and competences in related analytical methodologies and experimental techniques. He/she will be particularly knowledgeable about the comprehension of complex biomolecular systems and of their applications in the biomedical and pharmaceutical industry, as well as about their transfer to society in relation to food, environment and cultural assets conservation.

The MBC Master Degree course provides the necessary training to independently practice biology, or to be employed in:

- basic and applied research activity in universities and in other public or private research centers;
- biomedical and pharmaceutical industries, spin-off and startup companies for self-directed and independent work, enabling graduates 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;
- functions of high responsibility in the industrial, environmental, health care, and public service sectors;
- biology teaching at all levels.

In addition, graduates will access sectors such as environmental science, scientific dissemination, intellectual property (patents) and business management. Moreover, full immersion English courses, provided by MBC, will allow graduates to perform equally well in job seeking in Italy and abroad.

The MBC graduate can be legally admitted to the "A Section" of the National Biologists Register.

Indicatively, the different sectors of the labor market accessible to Master graduates are hereafter outlined, with reference to the intellectual, scientific and highly-specialized professions provided by the ISTAT 2008, NUP Isfol-Istat Classification of Professions:

- Biologists and related professions - (2.3.1.1.1)
- Researchers and technicians graduated in the area of biological sciences - (2.6.2.2.1)

## Pre-requisites for admission

For admission to the MBC course, students must meet curriculum requirements and have suitable background knowledge (DM 270/04).

Entry is open to:

- Graduates in Biological Sciences (Class L-13) from any Italian University that follows CBUI rules, as adequately certified ([www.cbui.unito.it](http://www.cbui.unito.it)). In this case, credits acquired by the candidate as an undergraduate will be fully recognized and will meet the curricular prerequisites.

- Biological Sciences (Class L-13) graduates from Universities that do not follow CBUI rules, graduates in other related areas and foreign graduates, who have acquired a title equivalent to the I level degree by Italian law, are requested to have earned at last 90 CFU in Biological Sciences (of Class L-13) subjects, including: basic subjects (such as mathematics, physics, statistics, informatics) and biological subjects (such as biochemistry, molecular biology, genetics, microbiology, general physiology, plant biology, developmental biology, others).

Students lacking adequate curricular requirements can contact the Coordinator of the Master course well in advance in order to plan acquisition of the requested CFU before the application deadline. The lacking CFU can be acquired by passing the relevant exams at the University of Milan or any other University.

The candidate's background knowledge in Biology will be verified by an interview.

For all students, the minimum requirement for knowledge of the English language is B1 level ("lower intermediate") of the Common European Framework of Reference (CEFR) for Languages or equivalent certification.

### **Programme structure**

The duration of the MBC Master degree program is two years, each year is subdivided into two semesters.

120 educational credits (CFU) are required to complete the Master. 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.

The curriculum includes mandatory, guided and open-choice courses. Subject choices are made as follows:

- 7 mandatory courses (45 CFU in total);
- 3 guided-choice courses on principal subjects (18 CFUs in total);
- 2 open-choice 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. If unavailable in English, open-choice courses can be taken in Italian.

In 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.

During the second year, the workload is centered on the experimental research activity related to the thesis (42 CFU in total, 12 of laboratory training and 30 acquired upon the final thesis exam) and on one course regarding laboratory methods.

### **Conscientious objection policy**

In the MBC Master degree the use of animals for teaching purposes is not allowed as stated by the 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, since, in this case, 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 uncontested right to conscientiously object to participation in any experimental activity using animals. In this case, the Teaching Board will suggest alternative traineeships, that are consistent with the educational goals of the MBC course, to ensure the correct acquisition of the study credits necessary for degree completion.

### **Campus**

Classrooms are located in the University buildings in: Via Celoria, 26 (Edifici Biologici); Via Celoria, 20 (Settore Didattico); Via Golgi, 19 most laboratories are located in the Department of Biosciences, Via Celoria 26, 20133 Milano.

### **Libraries**

Biblioteca Biologica Interdipartimentale (Via Celoria, 26).

### **Tutoring**

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

### **Core / compulsory activities**

All above-mentioned training activities, including mandatory, guided and open-choice courses, and experimental research activities during the thesis internship, are compulsory for completing a Master Degree.

### **Language test / computer literacy test**

In order to get their degree, students are required to certify their knowledge of the English language at the B2 level. This level can be certified in one of the following ways:

- by submitting their language certificate, taken no more than 3 years before its submittal and attesting a B2 or higher level (for the list of the language certificates which are accepted by the University of Milan, please refer to the website: <http://www.unimi.it/studenti/100312.htm>).

Students can submit their language certificate during the immatriculation procedure or send it to the Language Centre of the University of Milan (SLAM) via the Infostudente service.

- by sitting the placement test run by SLAM, during the first year exclusively, from September to February. Should they not

pass the Placement Test, students will have to attend the English language course organized by SLAM. All students who do not have a valid language certificate must sit the Placement Test. Those students who do not sit the Placement test by February or do not pass the end of course test in one of the 6 attempts granted will have to get a language certificate outside the University of Milan within their degree.

### **Compulsory attendance**

Course attendance is strongly recommended.

### **Testing and assessment procedures**

University credits will be earned through: lectures, exercises, laboratories and dissertation, normally carried out at the DBS of the Università degli Studi di Milano. Course exams must be passed, with grades calculated on a 30-point scale, to obtain course credits. Assessment will consist of an oral or written exam. For courses structured into modules, a head lecturer will be identified as the coordinator, and evaluation procedures for course outcomes, 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 SIFA online Service. For each course, at least 6 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 SIFA site available at <http://www.unimi.it/>, in order to allow CFUs to be automatically accredited to the student's personal record.

Students are advised to only sit exams during course breaks.

### **Study plan definition and submission for approval**

The study plan should be coherent with the principal and related courses of the Master and with the subject of the experimental thesis work. The student is free to include, in his/her study plan, courses that differ from those suggested, provided that they match the requested CFU. However, such courses must be previously evaluated by the Study Plan Committee and approved by the Teaching Board.

The study plan must be submitted online in the 2nd Year, via the web address [http://www.unimi.it/studenti/servizi\\_online.htm](http://www.unimi.it/studenti/servizi_online.htm), within the deadline set by the Segreteria Studenti, generally between December and March, if only MBC suggested courses have been selected. Students taking electives outside of MBC are requested to submit a study plan for approval by the Study Plan Committee by May of the first year. For information on dates and procedures for submitting the official study plan, please visit the relevant section of the UNIMI website.

Approval of the study plan by the Teaching Board is mandatory. To favor the correct planning of educational activities, students are encouraged to discuss the study plan with their tutors during the first year and/or contact the Student Information office, at the DBS (2A).

NB: Admission to the final exam 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 the final exam.

### **Internship criteria**

#### **THE THESIS**

In order to obtain 30 CFU in the final exam, the student must acquire 12 CFU of laboratory training and present his/ her Master thesis to the thesis committee. The Master thesis is a dissertation written in English and regards the research activities performed by the student during the 2nd year Internship in a research laboratory, under the guidance of a supervisor (Relatore) and a co-tutor (Correlatore). The thesis contains original data generated on the given research subject belonging to the principal disciplines of the MBC Master course. The internship lasts about one solar year (including 12 CFU of laboratory training) and normally starts in the summer of the first year. Compilation theses are by no means allowed. Master Theses are internal and external. Internal Experimental Theses are carried out at the DBS or in other Departments of the University, to which the BMC teaching staff belong.

External Experimental Theses are carried out in other Departments of the University, or in other public Institutions with adequate facilities. Authorization to perform an external Thesis is given by the Teaching Board, after careful evaluation of the proposed thesis subject and of the quality of the proponent laboratory. To place an application for an External Thesis the student must follow the rules indicated at <http://www.cdbiol.unimi.it> (procedure per l'attivazione di stage esterno). The application must be submitted well in advance, as it requires the approval of the Teaching Board. The Supervisor of an external thesis must be a member of the Teaching Board of Biological Sciences of the DBS.

It is also possible to acquire part of the CFU by means of stages or other kinds of experiences in working environments, providing specific theoretical and technical expertise.

#### **HOW TO SELECT AN INTERNSHIP AND SUBMIT A THESIS APPLICATION**

As a rule, around February of the first year and October of the second year, students will be informed of the research areas offered in the host laboratories, the starting dates and the number of internships available on the website ([http://www.campagnenaturalistiche.unimi.it/offerte\\_tesi/](http://www.campagnenaturalistiche.unimi.it/offerte_tesi/)) and by informative open days organized to present the research interests of the teaching staff and application modalities. Teaching members will communicate place acceptance to students and the MBC coordinator, within the set deadlines. The internship officially starts upon submission of the appropriate form to the MCB Master's office (via Celoria, 26 – 2nd floor, tower A).

The MBC Coordinator will ensure that every student is assigned to a laboratory for the internship and will approve an external thesis only if internal placements are unavailable. In this case, 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 eventually decides if the student can present his/her thesis in the final exam. The thesis must state on the front page where the internship has been carried out.

#### **ADMITTANCE TO THE FINAL EXAM**

The student is admitted to the final exam if:

- 1) he/she has passed the requested mandatory, sector-guided and open-choice courses and has therefore acquired the indicated number of CFU, including the 3 CFU assigned to the advanced English knowledge and the 12 CFU of laboratory training;
- 2) he/she has completed the internship, as stated by the certificate.

#### **Degree programme final exam**

The MBC Master Degree will be obtained by passing a final assessment, which consists of submitting and presenting a dissertation in English on the research performed by the student during his/her internship. The work will be presented in English and will be followed by a public debate in front of the thesis committee. The committee will evaluate the work presented and the student's overall performance throughout the two-year Master, before awarding a grade based on a 110-point scale. The degree issued by the Committee is "Laurea Magistrale" (Master Degree) in Biology.

#### **Lecture timetable**

The first Semester starts on October 1st 2019 and ends on January 20th 2020.

The second Semester starts on March 2nd 2020 and ends on June 19th 2020

The complete timetable of the individual courses will be posted at the following address <http://www.cdbiol.unimi.it>

### ***EXPERIENCE OF STUDY ABROAD AS PART OF THE DEGREE PROGRAM***

The University of Milan supports the international mobility of its students, offering them the opportunity to spend study and training periods abroad, a unique opportunity to enrich their curriculum in an international context.

#### **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, France, Germany, Ireland, Poland and Iberian Peninsula (see <http://www.dbs.unimi.it/ecm/home/erasmus/studenti-in-uscita/scienze-biologiche>). 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 [www.unimi.it](http://www.unimi.it) >Studenti>Studiare all'estero> Erasmus+.

Accepted students must present a study plan that reports all the activities he/she intends to perform abroad, detailing the corresponding CFU; 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 study plan, to be carried out under the Erasmus+ program, must be coherent with the MBC course content and must be evaluated and approved by the Teaching Board. If necessary, the Teaching 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 CFU.

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).

#### **How to participate in Erasmus mobility programs**

To gain access to mobility program for study purposes, lasting 3-12 months, the enrolled students of the University of Milan must attend a public selection that starts usually around the month of February each year through the presentation of specific competition announcements, which contain information on available destinations, respective duration of the mobility, requirements and deadlines for submitting the online application.

The selection, aimed at evaluating i) the proposed study abroad program of the candidate, ii) knowledge of a foreign language, especially when this is a preferential requirement, and iii) the motivations behind the request, is performed by specially constituted commissions.

Each year, before the expiry of the competition announcements, the University organizes information sessions for the specific study course or groups of study courses, in order to illustrate to students the opportunities and participation rules. To finance stays abroad under the Erasmus + program, the European Union assigns to the selected students a scholarship that - while not covering the full cost of living abroad - is a useful contribution for additional costs as travel costs or greater cost of living in the country of destination.

The monthly amount of the communitarian scholarship is established annually at national level; additional contributions may be provided to students with disabilities.

In order to enable students in economic disadvantaged conditions to participate in Erasmus+ program, the University of

Milan assigns further additional contributions; amount of this contributions and criteria for assigning them are established from year to year.

The University of Milan promotes the linguistic preparation of students selected for mobility programs, organizing every year intensive courses in the following languages: English, French, German and Spanish.

The University in order to facilitate the organization of the stay abroad and to guide students in choosing their destination offers a specific support service.

For assistance please contact:

International Mobility Office

Via Festa del Perdono, 7 (first floor)

Phone: (+39) 02.503 13501-13502-13495-12589

e-mail: [mobility.out@unimi.it](mailto:mobility.out@unimi.it)

[international.education@unimi.it](mailto:international.education@unimi.it)

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

### **Application and enrolment information and procedures**

#### **APPLICATION FORM**

Both Italian and foreign students must submit admission applications by the deadlines indicated in the "student area" of the University web portal. Undergraduates who intend to graduate by December 2019 may also apply. Completion of the application form is compulsory and must be submitted electronically to the following address: [http://www.unimi.it/studenti/servizi\\_online.htm](http://www.unimi.it/studenti/servizi_online.htm)

#### **BACKGROUND KNOWLEDGE**

The prerequisite to access the MBC Master Degree program is an adequate knowledge of the fundamentals of biological disciplines. This will be verified through 1) evaluation of the bachelor study program and 2) direct assessment of candidate scientific background knowledge. The candidate's background knowledge in Biology will be verified by an interview with the Commission for Admittance to the Master, composed by teaching members appointed by the Teaching Board. The interview will evaluate the expertise of the candidate in topics related to the MBC degree, and will ascertain the knowledge of the English language.

The committee evaluates the candidate on a 100-point scale:

-up to 25/100 will be given for the graduation grade;

-up to 10/100 for the curriculum (type of degree, outnumbered free courses, Erasmus experience, others...)

-up to 65/100 for the interview

The minimum requirement for admission is 60/100. As a possible outcome, despite meeting the requested curricular requirements, the candidate may be refused admission; such an outcome will prevent admission for the current year.

For the Academic Year 2019-2020, applicant interviews for those who submit their application within the set deadline (see above, "Application Form"), will take place at the Department of Biosciences, Via Celoria 26, room 2A, on the following days:

- September 25th 2019 at 14.30, for graduated students;

- November 7th 2019, at 14.30, for students that graduate in September and October;

- January 16th 2020, at 14.30, for students that graduate in December. Students must bring an ID card.

For foreign students who are not resident in Italy and were awarded their bachelor degree abroad, evaluation will be performed, based on the candidate curriculum and students may be invited to an online interview. Foreign students who reside in Italy are classed as Italian citizens and must sit the same exams. It is advisable to check for any possible updates about exam dates and times on the website: <http://www.cdbiol.unimi.it>

### **Practical instructions**

#### **MBC COURSE ENROLLMENT**

Only graduates who have successfully passed the entrance exam can be enrolled in the MBC course.

Registration will open 5 working days after the interview, according to the terms and conditions indicated at <http://www.unimi.it/studenti/matricole/77670.htm>

Students from the Università degli Studi di Milano that have acquired extra-numerary CFU during their LT course by passing MBC exams, can ask for those credit to be recognised among the 120 CFU required for MBC graduation.

Students from other Universities, upon graduation, must present certification of the awarded degree at the Segreteria Studenti.

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

25

<b>1st COURSE YEAR Core/compulsory courses/activities</b>				
<b>Scheduling</b>	<b>Learning activity</b>	<b>Module/teaching unit</b>	<b>Ects</b>	<b>Sector</b>
	English proficiency B2 (3 ECTS)		3	L-LIN/12
1 semester	Advanced molecular biology		6	BIO/11
1 semester	Molecular bioinformatics		6	INF/01

1 semester	Organic chemistry applied to biology		6	CHIM/06
2 semester	Molecular genetics		6	BIO/18
2 semester	Protein biochemistry		6	BIO/10
2 semester	Structural biology of the cell		6	BIO/06, BIO/01
Total number of compulsory credits/ects			39	
<b>2nd COURSE YEAR Core/compulsory courses/activities</b>				
<b>Scheduling</b>	<b>Learning activity</b>	<b>Module/teaching unit</b>	<b>Ects</b>	<b>Sector</b>
year	Biomolecular methods laboratory		9	BIO/11, BIO/10, BIO/18
year	Laboratory training		12	NA
Total number of compulsory credits/ects			21	
<b>Further elective courses</b>				
<b>The student must choose one of the following three courses:</b>				
1 semester	Developmental biology and genetics		6	BIO/18
1 semester	Functional genomics		6	BIO/11, BIO/18
1 semester	Molecular microbiology and genetics of microorganisms		6	BIO/19, BIO/18
<b>The student must choose one of the following three courses:</b>				
1 semester	Biomembranes		6	BIO/09
1 semester	Molecular pharmacology and immunology		6	MED/04, BIO/14
2 semester	Stem cells and genetic diseases		6	BIO/14
<b>The student must choose one of the following three courses:</b>				
1 semester	Synthetic biology		6	BIO/11, BIO/10, BIO/19, BIO/18, BIO/04
2 semester	Methods in biochemical investigation		6	BIO/10
2 semester	Signal transduction		6	BIO/10, BIO/04
<b>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. If unavailable in English, open-choice courses can be taken in Italian.</b>				
<b>End of course requirements</b>				
	Final dissertation		30	NA
Total number of compulsory credits/ects			30	

## COURSE PROGRESSION REQUIREMENTS

There are no propaedeutic courses in the MBC program 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 Degree program to MBC, will undergo the audit of an ad hoc committee that will decide if and how many of the CFU previously acquired by the student can be validated upon admittance to MBC. In addition, the Teaching Board can decide to test the background knowledge of the candidate by interview, or to request additional exams.

#### CFU ACQUIRED DURING PROFESSIONAL EXPERIENCES

A maximum of 9 (supernumerary) CFU can be acquired (according to art. 5, comma 7, del DM 270/2004) by certified professional experiences and by post-secondary level educational activities performed in association with the University, only after approval by the course coordinator.