



**UNIVERSITA' DEGLI STUDI DI MILANO**  
**MANIFESTO DEGLI STUDI A.A. 2021/22**  
**LAUREA MAGISTRALE IN**  
**BIOMEDICAL OMICS (Classe LM-9)**  
**Enrolled from academic year 2020/21**

### **GENERALITA'**

<b>Classe di laurea di appartenenza:</b>	LM-9 BIOTECNOLOGIE MEDICHE, VETERINARIE E FARMACEUTICHE
<b>Titolo rilasciato:</b>	Dottore Magistrale
<b>Durata del corso di studi:</b>	2 anni
<b>Crediti richiesti per l'accesso:</b>	180
<b>Cfu da acquisire totali:</b>	120
<b>Annualità attivate:</b>	1°, 2°
<b>Modalità accesso:</b>	Programmato
<b>Codice corso di studi:</b>	D58

### **RIFERIMENTI**

#### **Presidente Collegio Didattico**

Prof. Pier Giuseppe Pelicci

#### **Docenti tutor**

Academic guidance tutor:

- Prof.ssa Myriam Alcalay
- Prof. Salvatore Pece
- Prof. Diego Pasini
- Dott.ssa Emanuela Colombo
- Dott. Gaetano Ivan Dellino
- Dott. Stefano Santaguida

#### **Sito web del corso di laurea**

<https://bo.cdl.unimi.it>

#### **International Students - Welcome desk:**

Email: [international.students@unimi.it](mailto:international.students@unimi.it)

#### **Student administrative office:**

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

### **CARATTERISTICHE DEL CORSO DI STUDI**

#### **Premessa**

The Master Program in Biomedical Omics belongs to Class LM-9, Master Programs in Veterinary Pharmaceutical and Medical Biotechnology. The Department of Oncology and Hemato-oncology (DIPO) of the University of Milan is the academic institution responsible for the Master Program in Biomedical Omics.

#### **Obiettivi formativi generali e specifici**

The advent of technologies that allow the global analysis of biological phenomena ("omics") has revolutionized the study of human diseases and opened new perspectives in the field of research, diagnosis and therapy, tracing the path for Precision or Personalized Medicine. The central element of Precision Medicine is in fact the quantitative description of biological or clinical phenotypes by high definition omics (genomics, epigenomics, proteomics, metabolomics, microbiomics, digital imaging, radiomics and radiogenomics).

The Master Program in Biomedical Omics aims at providing students with a broad understanding of omics disciplines applied to medicine and first-hand practical experience with different omics techniques. Key competences of graduates include the ability to design experiments, manage the work flow, analyze and interpret omics data, and create applications for future developments in omics approaches.

#### **Risultati di apprendimento attesi**

Knowledge and understanding

Graduates in Biomedical Omics will have theoretical knowledge and practical experience in omics disciplines applied to the clinics. Key competences will include the ability to design experiments, manage work flow, analyze and interpret data and devise new strategies for further development of omics approaches. The courses and training activities will provide specific

skills in omics disciplines and in the computational approaches that are necessary for the interpretation of results. Graduates will also be familiar with the legal, ethical and decision-making aspects related to the handling of sensitive data.

#### Applying knowledge and understanding

A key objective of the Master's Degree course in Biomedical Omics is to provide graduates with the full capacity to apply the theoretical knowledge they receive. To achieve this goal, a relevant amount of time will be devoted to practical training and to the experimental thesis deriving from a research project that can be conducted in a national or international, academic or industrial laboratory.

### **Profilo professionale e sbocchi occupazionali**

Graduates in Biomedical Omics will be able to pursue careers as Technologists in Biomedical Omics:

Tasks: Coordination and execution of omics techniques in routine diagnostics or clinical research within hospital laboratories.

Skills:

- i) understanding of the clinical demand underlying the required analyses;
- ii) execution of omics analyses;
- iii) interpretation of results;
- iv) introduction of technological upgrades in the clinical laboratory and development of technology upgrades to adapt standard protocols to local needs.

Employment opportunities: diagnostic laboratories in hospitals and clinical research laboratories.

Graduates will also have the possibility to work in basic research laboratories, in biotechnological development institutes, or to continue their academic training by enrolling in doctoral programs or second-level masters programs, both in Italy and abroad.

### **Conoscenze per l'accesso**

Access to the programme is capped locally

#### Italian Students

The requirements to access the Master Program in Biomedical Omics are:

- The achievement of a bachelor degree program in one of the following classes: L-2 Biotecnologie (Biotechnology), L-13 Scienze biologiche (Biology), L-27 Scienze e tecnologie chimiche (Chemistry), L-29 Scienze e tecnologie farmaceutiche (Pharmaceutical sciences).
- Having acquired at least 40 ECTS in the scientific disciplines (SSD): BIO/06, BIO/08, BIO/09, BIO/10, BIO/11, BIO/12, BIO/13, BIO/14, BIO/15, BIO/16, BIO/17, BIO/18, BIO/19, CHIM/01, CHIM/02, CHIM/03, CHIM/06, CHIM/07, CHIM/08, CHIM/09, MED/01, MED/02, MED/03, MED/04, MED/05, MED/07, MED/08, MED/43, MED/44, MED/46, MED/50, SECS-S/01, SECS-S/02.
- Knowledge of English (B2 certification).

#### Foreign Students

Students must have a Bachelor's degree in one of the disciplines described above (Biotechnology, Biology, Chemistry, Pharmaceutical sciences). The number of hours/credits of the specific courses must be clearly identifiable in the academic curriculum. If this is not possible, documents certifying the students' career will be examined by the Faculty to assess if their background complies with the admission requirements.

#### B2 entrance level:

Proficiency in English at a B2 level or higher, under to the Common European Framework of Reference for Languages (CEFR), is required for admission.

The B2-level requirement will be ascertained by the University Language Centre (SLAM) upon admission as follows:

- By a language certification at or above B2, obtained no more than 3 years earlier. For the list of language certifications recognized by the University please review: <https://www.unimi.it/it/studiare/competenze-linguistiche/placement-test-e-corsi-di-inglese/test-di-ingresso-di-inglese>). The certification must be uploaded when submitting the online application;
  - By the English level achieved during a Bachelor's degree programme through SLAM courses and tests. The certificates must be less than four years old, and will be assessed administratively, without the applicant having to attach any certificates;
  - By the entrance test, which will be delivered by the SLAM on September 21st 2021, and at on December 10th 2021, only for students who have applied for admission at a later date. All those who fail to submit a valid certificate or do not meet the required proficiency level will be invited to take the test through the admission procedure.
- Candidates who do not sit or pass the entrance test will have until 31 December 2021 to obtain and submit one of the recognized certifications to the SLAM.
- Students who do not meet the requirement by 31 December will not be admitted to the Master's degree programme and cannot sit further tests.

### **Struttura del corso**

The Master program in Biomedical Omics is a two-year course, corresponding to four semesters. Students must earn 120

educational credits (CFU = Crediti Formativi Universitari) to complete the Master's degree.

One CFU corresponds to a workload of 25 hours and is calculated as follows:

- lectures: 1 CFU = 8 hours of lectures and 17 hours of independent study;
- practicals: 1 CFU = 16 hours of laboratory activities and 9 hours of independent study;
- experimental projects (thesis work): 1 CFU = 25 hours of laboratory and/or training activities.

All activities of the course will be held in English.

The first year courses will cover: omics technologies and their applications, computational approaches for analysis, interpretation and management of omics data, legal implications of omics analyses, laboratory management and technology transfer, for a total of 54 CFU. Lectures in omics and computational approaches will be complemented by practical training (6 CFU).

In the second year, students will study the application of omics technologies in diagnostic and clinical settings, experimental design and model systems, and ethical issues concerning the use of omics in a clinical setting (24 CFU).

The second year will be largely dedicated to the production of an experimental thesis (28 CFU) deriving from a research project. The national and international laboratories where students can carry out their thesis projects will be selected on the basis of quality.

Finally, during the course students will gain 8 CFU from any course of their choice offered by the University of Milan.

### **Obiezione di coscienza**

The use of animals for teaching purposes is not allowed by law, but can be included in the experimental work performed for thesis preparation. According to Italian law Act No. 413 of October 12, 1993, students have the incontestable right to conscientiously object to participate in any experimental activity using animals. In this case, the Faculty will suggest alternative research projects to ensure degree completion.

### **Area didattica**

Lectures will be held in the educational center of the European Institute of Oncology. Laboratory activities will be held in the research and clinical laboratories of institutions represented in the Department of Oncology and Hemato-oncology of the University of Milan.

### **Tutorato**

Students will be assigned a tutor upon admission to the course. Tutors will provide students with academic advice, guidance on their course and thesis choices and, if requested, personal advice.

### **Obbligo di frequenza**

Students are required to attend to at least 75% of teaching activities.

The experimental project leading to the final dissertation is considered mandatory for the Master Degree.

### **Modalità di valutazione del profitto**

Each course is followed by an exam, usually a written or an oral test (or a combination). Course exams must be passed, with grades calculated on a 30-point scale, to obtain course credits, with 18/30 being the minimum pass grade. Credits for a course are only granted upon passing the corresponding exam. Courses can be taught by more than one instructor: in this case, only one lecturer will be responsible for the final assessment of the student.

<https://bo.cdl.unimi.it/en/study/exams>

### **Formulazione e presentazione piano di studi**

<https://bo.cdl.unimi.it/en/study-plan-submission>

### **Caratteristiche della prova finale**

The final exam consists of the presentation and discussion of an experimental thesis based on data obtained by the student in a research or clinical omics laboratory. The thesis will be elaborated under the supervision of a Faculty member of the Biomedical Omics Master Program with the collaboration of the tutor. A committee of 5 Faculty members will evaluate the thesis dissertation and assign a score of maximum 10 points. The final grade will derive from the weighted average of the grades in the lecture courses, calculated on a scale of 110, to which the points of the final dissertation will be added.

### **Orario lezioni**

<https://bo.cdl.unimi.it/en/study/course-timetable>

## **ESPERIENZA DI STUDIO ALL'ESTERO NELL'AMBITO DEL PERCORSO FORMATIVO**

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 and other Extra-EU 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.

### Modalità di partecipazione ai programmi di mobilità - mobilità Erasmus

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 generally begins around February each year with the publication of a call for applications specifying the destinations, with the respective programme duration (from 2/3 to 12 months), requirements and online application deadline.

Every year, before the deadline for the call, the University organizes informative meetings to illustrate opportunities and rules for participation to students.

Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which is 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.

Learn more at <https://www.unimi.it/en/international/study-abroad/studying-abroad-erasmus>

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](mailto:mobility.out@unimi.it)

Student Desk booking through InformaStudenti

## MODALITA' DI ACCESSO: 1° ANNO PROGRAMMATO

### Link utili per immatricolazione

<https://www.unimi.it/it/studiare/frequentare-un-corso-di-laurea/iscriversi/iscriversi-un-corso-magistrale>

### Istruzioni operative

Italian and foreign students will be selected based on the score of the admission test, which will be held in September. The date of the entrance test will be published on the website of UniMi.

More information can also be found in the Departmental website: <http://www.dipo.unimi.it>

### N° posti riservati a studenti extracomunitari non soggiornanti in Italia

5

### N° posti assegnati

30

### Modalità della prova

The selection will be based on the results of written examination consisting of multiple-choice questions on topics such as molecular biology, biochemistry, genetics and statistics.

1° ANNO DI CORSO Attività formative obbligatorie				
Erogazione	Attività formativa	Modulo/Unità didattica	Cfu	Settore
annuale	Practical laboratory activities		6	NA
1 semestre	Genomics an Epigenomics (tot. cfu:12)	Genomics	6	BIO/10, BIO/11, MED/04
		Epigenomics	6	BIO/10, BIO/11, MED/04
1 semestre	High-throughput screenings		6	MED/04
1 semestre	Proteomics		6	BIO/10
1 semestre	Radiomics		6	MED/04, MED/36
2 semestre	Computational approaches for omics data		12	ING-INF/05,

				INF/01
2 semestre	Legislation, management and technology transfer (tot. cfu:12)	Legislation and technology transfer	6	MED/43
		Laboratory Management	6	MED/46
		Totale CFU obbligatori	60	
<b>2° ANNO DI CORSO Attività formative obbligatorie</b>				
<b>Erogazione</b>	<b>Attività formativa</b>	<b>Modulo/Unità didattica</b>	<b>Cfu</b>	<b>Settore</b>
1 semestre	Clinical Omics		6	MED/15, MED/11, MED/06
1 semestre	Ethics and decision-making		6	M-PSI/01
1 semestre	Experimental design		6	BIO/11, MED/04
1 semestre	Omics in diagnostics		6	MED/03, MED/08
		Totale CFU obbligatori	24	
<b>Attività a scelta</b>				
8 CFU from courses of their choice offered by the University of Milan during the second year.				
<p>To obtain the degree, students without an Italian degree or diploma are required to demonstrate an Italian language proficiency at level A2 within the Common European Framework of Reference for Languages (CEFR). This level can be assessed by the end of the first year in the following ways:</p> <ul style="list-style-type: none"> <li>- by submitting the language certificate achieved no more than three years prior to the submission, at level A2 or higher, recognised by the University (the list of recognised language certificates can be found at: <a href="https://www.unimi.it/en/study/language-proficiency/italian-courses-and-tests">https://www.unimi.it/en/study/language-proficiency/italian-courses-and-tests</a>). The language certificate must be uploaded through the service <a href="http://www.unimi.infostudente.it">www.unimi.infostudente.it</a>, by choosing the category SLAM;</li> <li>- by an entry-level test, organised by SLAM, to be taken at the beginning of the second year of study.</li> </ul> <p>Students who attain A2 level through a certificate or the entry-level test must earn 3 ECTS credits in other Electives. Students who fail to reach level A2 will have to attend an Italian course organised by SLAM and to pass the final test during the I semester of the second year of study in order to earn 3 ECTS credits of Additional Language Skills: Italian.</p>				
	Additional Language Skills: Italian (3 ECTS)		3	ND
<b>Attività conclusive</b>				
	Final exam		28	NA
		Totale CFU obbligatori	28	