Master of Science in Biotechnology for Industry and Health Program Handbook

Academic year 2025/2026

The cultural horizon

The M.Sc in Biotechnology for Industry and Health (Class LM-8 – R Industrial Biotechnology) offers a comprehensive program that integrates advanced and foundational knowledge in biotechnology, preparing students for diverse applications in both industrial and health-related fields. The teaching staff includes professionals from the world of industrial and clinical research, in order to link the knowledge of the fundamental elements of science and technology with the skills necessary to prepare second-level graduates to work in laboratories or companies engaged in research, development, production and control activities in the biotechnology, pharmaceutical and biomedical fields.

The course in brief

The Degree Course includes two distinct curricular pathways:
The first curriculum, called **Experimental Biotechnology,** provides a preparation aimed at developing a deep knowledge of the theory and fundamentals of biotechnology and developing the necessary skills to perform different roles in the laboratories of public research institutions or private laboratories engaged in research or development of biotechnological products.
The second curriculum, called **Clinical Research**, aims at training professional figures such as the Clinical Monitor (also known as CRA, Clinical Research Assistant), the Auditor or the staff assigned to regulatory activities, who perform organizational, managerial, and control roles in the field of clinical trials of new drugs. The course aims to provide a set of basic knowledge that makes the new graduate uniquely and immediately recognizable and interesting in his profile for the Human Resources offices of the reference companies in the Clinical Research area.
Further information can be found on the course web page: https://biotechnology.uniroma2.it/
The entire course is taught in person, with limited opportunity for online teaching.

Access procedures

A maximum of 60 students can be admitted. Citizens from Italy and other EU or non-EU countries can be admitted to the selection, with a reserve of 20 places for foreign students.
To be admitted to the Master's Degree course in Biotechnology it is necessary to have a first-level degree or a three-year university degree or other qualification obtained abroad recognized as suitable. It is also necessary to certify the knowledge of the English language at a level at least equal to B2. A preliminary evaluation phase of the possession of the curricular requirements is foreseen for all applicants (see below).
The access procedures for students residing in the European Community are different from those provided for foreign students who need an entry visa. The different access procedures for students requiring a visa and for Italian students or students residing in the European Union are described in the Call for Enrollment.
Enrollment in the Master's Degree Program in Biotechnology for Industry and Health is subject to the verification of curricular requirements and the adequacy of the candidate's academic preparation.
To be admitted to the Master's Degree Program in Biotechnology, candidates must meet the following requirements:

1. Possession of a Bachelor's Degree in one of the following categories:
Degrees in Biology (Class 12, D.M. 509/1999 or Class L-13, D.M. 270/2004)
Degrees in Biotechnology (Class 1, D.M. 509/1999 or Class L-2, D.M. 270/2004)
Degrees under the old system in Biological Sciences (prior to D.M. 509/99)
or
Related degrees, provided ECTS credits have been earned in the following disciplinary fields:

o **At least 36 credits in Area 05** – Biological Sciences, explicitly including credits in all of the following subjects:
– Biochemistry (BIO-10)
– Cell Biology (BIO-06)
– Molecular Biology (BIO-11)
– Genetics (BIO-18)
– Physiology (BIO-09)
– Microbiology (BIO-19)
o **At least 12 credits in Area 03 – Chemical Sciences** (CHIM/01-CHIM/12)
o **At least 6 credits in Area 01 – Mathematical and Computer Sciences** (MAT/01-MAT/09).

If the academic qualification was obtained abroad, it must correspond to the first cycle of the Bologna Process framework and be classified as Level 6 in the European Qualifications Framework (EQF). The degree must have been earned at a higher education institution that allows progression to the next academic level (second cycle of the Bologna Process/Level 7 EQF) in the country where the degree was obtained.
The evaluation of academic qualifications will be supplemented by an analysis of the official course **syllabi** and an **interview** aimed at assessing the student's personal preparation.

2. Proficiency in the English language at a minimum B2 level (Upper-Intermediate) according to the Common European Framework of Reference for Languages (CEFR). This proficiency **must be certified** through a valid language certificate obtained after August 2019 and issued by a recognized certification body, such as: Cambridge English Language Assessment, IELTS, Trinity College London, ETS, TOEIC, TOEFL iBT, Pearson EDEXCEL/EDI, English Speaking Board (ESB), Anglia Ascentis Certificate, Aim Awards (General English/Business English), C.C.I Examination Board (London Chamber of Commerce and Industry), British Institutes. Candidates **are exempt** from the required certification if they have obtained a degree from a program taught in English or if they are nationals of a country where English is the native language, as well as graduates of an Italian university who have taken an English language exam of at least 3 ECTS during their degree program.
N.B. For students interested in the **Clinical Research curriculum**, it is **strongly recommended** to have a good knowledge of the **Italian language (B2 level)**.

Candidates lacking the above requirements will be notified of necessary curricular integrations to be completed prior to individual preparation assessment. Deficiencies may be addressed via enrollment in single-subject courses.
Students in possession of a Bachelor's degree issued by an EU country can access the request for evaluation of qualifications according to the procedures described in the above-mentioned Call for Enrollment.

Based on the regulations established by the Ministry of University and Research (MIUR) in accordance with the Ministry of the Interior and the Ministry of Foreign Affairs, the enrollment of non-EU candidates who are not resident in Italy involves 3 basic steps:

- The qualification assessment for the selected course
- An online pre-enrollment application through the Universitaly portal
- Obtaining an entry visa from the Italian Embassy or Consulate in their country

The **preliminary assessment** of admission requirements must be requested through an online procedure at http://delphi.uniroma2.it . At this stage, the student must provide a copy of their university degree diploma, the complete transcripts of the exams, a copy of the identity document, and any other document useful for assessing the qualification (Syllabus of the course, letters of recommendation, CV, indications about previous laboratory experiences and any document proving additional experiences).

The evaluation of the qualification can only be carried out after the payment of the 30 Euro fee. A guide to the payment is available .

For the academic year 2025-2026 it is possible to submit documents for the evaluation of qualifications in the period between the beginning of February and the end of April.

It is suggested that the following documents be included in the optional documentation.
– CIMEA Statement of Verification (to be obtained from the link: https://www.cimea.it/pagina-attestati-di- comparabilita-e-verifica-dei-titoli) (the qualification issuing service should resume at the end March 2024)
– CIMEA Statement of Comparability (to be obtained from the link: https://www.cimea.it/pagina-attestati-di- comparabilita-e-verifica-dei-titoli), for candidates holding qualifications issued by countries not signatories to the Lisbon Convention. Please, note that the processing time for CIMEA Statement of Verification and/or Comparability is 60 working days. Therefore, submit your application as soon as possible.
– Statement of Correspondence, downloadable from the ARDI platform (https://ardi.cimea.it/en) for candidates holding qualifications issued by countries not signatories to the Lisbon Convention.

The submission of these documents in the pre-enrollment phase is not mandatory, but please note that their possession can facilitate the subsequent visa-issuing procedure, as admitted candidates will have to upload these documents on the Universitaly platform, to request the visa and to finalize enrollment.

Students who will pass this preliminary step will be admitted to an **online interview** aimed at verifying the actual skills in the subjects defined as fundamental for admission.
Students admitted to the course will receive a letter of acceptance necessary to complete the subsequent procedures necessary to make admission to the course effective (Application to Universitaly and visa request to the Italian Embassy in their country).
Non-EU students with an international qualification (BSC), but resident in Italy, will be able to submit an application within the same timeframes as students with an EU qualification, but will still have to submit the same documentation required for visa applicants (Transcript, CIMEA documents...) and go through an interview to verify preliminary knowledge.
For more information, visit the course website on the https://biotechnology.uniroma2.it/admissions/

Dates for finalizing enrollment in the master's degree course:
First semester: from April 22, 2025 – December 31, 2025
Second semester: February 2, 2026 – March 31, 2026
Detailed instructions for enrollment can be found on the International Students Office website

Possibility of part-time enrollment
It is possible to apply for part-time enrollment, paying university fees at a reduced rate with longer learning path times, to avoid going off course. The option is not open to out-of-course students.
The part-time regulation is available at http://delphi.uniroma2.it using the link "enrollment as a part-time student" together with the tables and procedures required for this type of enrollment.

Transfers from other universities
The transfer from other universities of students with the appropriate requirements (which will be verified with criteria comparable to those described previously for students requesting visas) can be accepted based on logistical possibilities. It will be possible to request the recognition of any credits earned in the previous career. Students must submit a preliminary application within the deadlines indicated on the call for enrollment.

PROGRAM GOALS

The Master of Science in Biotechnology for industry and Health aims to train graduates who have adequate expertise in applying the scientific method to biological systems, with particular reference to the use of tools and skills in different sectors of biotechnological disciplines to solve problems, produce goods, and offer services. Through this program, students will be able to develop a deep knowledge of the theory and fundamentals of biotechnology and develop biotechnology laboratory skills, with a comprehension of the real-world biotech business and clinical research. The course is provided entirely in English, thus allowing students to achieve greater competitiveness in the national and international labor market.

Expected learning outcomes, expressed through the Dublin descriptors

Knowledge and Understanding

Graduates of the M.Sc. in Biotechnology for Industry and Health will acquire a solid understanding of the structure and function of biological systems, grounded in molecular and informational principles, from the cellular level to that of whole organisms. They will deepen their knowledge of biological macromolecules and cellular processes of biotechnological relevance, and will master the methodologies needed to study and optimize such processes for applications across various sectors.

They will also develop advanced expertise in the principles and instrumental methods for the structural and functional characterization of biomolecules, in the design of new variants using bioinformatics tools, and in their production at industrial scale. Moreover, they will gain specialized knowledge in the design and development of nanomaterials and nanosystems based on biomolecules of biotechnological interest.

Depending on the chosen specialization track, graduates will acquire additional competencies. In one track, the focus will be on the design and development of biotechnological biosensors, regulation of gene expression, genome editing techniques, the use and manipulation of microorganisms in biotechnology, as well as the management and organization of biotechnological processes and facilities, including an in-depth understanding of the economic aspects related to the development of biotechnological processes. In the other track, students will delve into topics such as clinical research methodology, including the design and development of new drugs, pathophysiological mechanisms as a basis for therapeutic strategies, the planning and management of processes involved in the development of health-related products, methods and tools for clinical data quality control and management, and national and international regulations governing clinical trials.

Graduates will also acquire transversal and professional skills in economics, legislation, communication, data analysis and retrieval, and foreign language proficiency. These competencies will enable them to work independently and take on responsibilities in the management of projects, facilities, and personnel.

Knowledge and understanding will be developed through lectures, laboratory activities, computational exercises, seminars, meetings with professionals, internships in university labs or external institutions, and potentially through study periods abroad.

Achievement of learning outcomes will be assessed through written and oral exams, as well as evaluations of reports and seminar presentations conducted as part of specific learning activities.

Applying Knowledge and Understanding

Graduates must have in-depth knowledge of, and be able to apply, techniques for genetic modification of microorganisms, cells, tissues, and organisms, as well as methods for the expression, purification, and analysis of biomolecules. They must also be proficient in applying core techniques across the various areas of industrial biotechnology, including the design and testing of both conventional and innovative drugs and vaccines, with particular attention to the multidisciplinary approaches that characterize the field.

They must be familiar with, and able to apply, techniques for the production of vectors and biomaterials, and be capable of retrieving and analyzing information from biological databases, as well as understanding, processing, and presenting scientific texts.

Among the key educational tools designed to enhance the ability to apply acquired knowledge is the experimental research project undertaken for the preparation of the master's thesis. This experience allows students to apply the scientific method learned throughout the course of study.

The achievement of learning outcomes is assessed through midterm tests, written and oral exams, evaluation of student-prepared reports, and the final thesis defense.

Communication skills

A key objective of this degree course is to provide graduates with the communication skills essential to

operate in the world of work. In this regard, we believe that the choice to provide teaching in English is fundamental to developing a better knowledge of the reference language in the scientific field.
In addition, the graduate must acquire:
- the ability to work in an interdisciplinary team.
- the ability to communicate unambiguously the knowledge/ results of one's research, both in written and oral form, adapting the level of communication to the interlocutors to whom it is addressed.
These skills will be acquired during the courses, through specific activities such as the elaboration of presentations starting from scientific articles, during the preparation of the thesis and through participation in seminars.
Learning skills
Master's degree graduates must:
- acquire skills that favor the development and continuous deepening of knowledge;
- knowing how to learn independently by drawing on advanced
texts, consultation of databases and other information online;
These skills are acquired progressively during the teachings, in the laboratory experiences, through the study of specific research problems, and during the thesis internship work.
The acquisition of these skills is checked on an ongoing basis during exams.

Employment areas envisaged for graduates
Graduates will acquire the competence needed to work in different fields, such as:

- Research in gene manipulation and production of proteins,
- Creation and monitoring of genetically modified organisms,
- Participation in new drug development processes,
- Food industry and food control,
- Industrial and environmental quality control,
- Molecular diagnostics and Clinical Research,
- Teaching (in Italy, class A-50 with the addition of 12 CFU GEO)

They can also get access to Ph.D. programs and to other secondary specialization schools.

It is worth underlying that the Biotechnology sector in Italy (as in the rest of the world) is constantly expanding, with the continuous growth of business initiatives, as indicated by the data provided by Assobiotec (https://assobiotec.federchimica.it/attiv/dati-e- analysis/biotechnology).

DIDACTIC STRUCTURE
The degree course lasts for two academic years. To complete the program, a total of 120 credits (CFU) must be acquired. 1 CFU is conventionally set as corresponding to 8 hours of lessons plus 17 hours of personal study, or to 12 hours of laboratory experience plus 13 hours of personal study. **Since the ambition of our courses is to provide cutting-edge information, not yet codified in conventional textbooks, attendance at courses is strongly recommended and is a central element for having excellent results in studies.**

Of the 120 CFU, 78 credits are from Core Courses and 10 credits are from Elective Courses. The final 32 CFU must be acquired by the students performing original research work (usually in a 6-8 months internship project), writing a 60-80 pages dissertation describing the results obtained, and defending the dissertation. The internship is mandatory. The internship is aimed at allowing graduates to acquire additional skills necessary for their proper inclusion in research or production activities. In fact, the student will participate to a research project, learning how to elaborate a project, defining its aims, techniques and feasibility, and reshaping it in relation to the results. The results of this study must be reported in an original paper (thesis), prepared under the guidance of a supervisor, which will then be illustrated and discussed in the presence of a graduation commission.
The internship can be carried out both in the university and in external research institutes (with which an agreement must exist or be stipulated). In this second case, the student will be followed by an external supervisor (or researcher not included among those who teach in the biological area courses of the University of Rome Tor Vergata). The thesis work and the drafting of the report will also be followed by an internal supervisor to whom the student must refer with regular updates. A professor of the CdS critically oversees the work and the written paper (Opponent). The discussion of the thesis takes place in a public session in front of a commission of professors who express the overall evaluation.

CORE COURSES (with the number of CFU and the relative scientific discipline (SSD) according to Italian regulations). Some courses are administered in two modules.
The Program offers two curricola, sharing the following core courses

Core Courses	**CFU**	**SSD**
Industrial Biochemistry and Bioinformaticsc (two modules)	12	BIO/10 - BIO/11
Applied Immunology (two modules)	6	MED/04 - MED/07
Cellular Biochemistry of Human Diseases (two modules)	6	BIO/10 - BIO/06
Nanobiotechnology-Based Pharmaceuticals (two modules)	6	CHIM/02 - BIO/19
Pharmacology and Medicinal Chemistry (two modules)	12	BIO/14 - CHIM/08
Stem Cells Biotechnology	6	BIO/13

STUDENTS CAN THEN CHOOSE BETWEEN

A - Curriculum Experimental Biotechnology

Applied Economics	6	SECS-P/06
Microbial Technology	6	BIO/19
Pharmaceutical applications of plant metabolites	6	BIO/04
Genome structure, expression and editing	6	BIO/18
Biosensor Technology	6	CHIM/01
Applied Economics	6	SECS-P/06

B - Curriculum Clinical Research

Physiopathology	6	MED/04
Clinical Data Quality Management (two modules)	6	MED/09
From Development to Market (two modules)	6	MED/01 + SECS- P/10
Clinical Research Methodology (two modules)	6	SECS-S/02
Clinical trials -Regulatory Activities	6	IUS/09

ELECTIVE COURSES
Students must attend Elective Courses to totalize 10 (or more) CFU. Elective activities are intended as an opportunity **to deepen, complete and personalize the training path, in harmony with the training objectives of the course**

In accordance, the following principles must orient the choice of elective courses in the M.Sc. in Biotechnology for Industry and Health:
1) Students are preliminarily invited to attend the Elective courses included in the Educational program of this Master of Science (see below). These courses have been specifically designed to complement the training goals of this M.Sc.
2) As a complement students may choose Elective Courses offered by the related course in Pharmacy;
3) in compliance with the principle that this course is provided in English, attendance of elective courses or activities in Italian must be discussed with the coordinator, justified by clear educational reasons and, in any case, kept to a minimum (no more than 2 CFU);
4) Students willing to attend a curricular course (i.e. compulsory exams in other courses of study, including Pharmacy) in place of Elective courses, **MUST preventively discuss with the coordinator** this possibility, to evaluate its coherence with the training goals and/or possible overlaps with our courses.

For the year 2025-26 the following Elective Courses are proposed:

Course	CFU	SSD
○ Fundamental of production for sterile products: biological and small molecules	3	BIO/14
○ Regenerative medicine for central nervous system diseases: approaches and future directions	2	BIO/10
○ Experimental and bioinformatics tools to study protein protein interactions	3	BIO/11
○ Protein-protein Interactions: Phage-display methodology	3	BIO/18
○ Experimental approaches to study neoplastic transformation	2	BIO/18
○ Nutrigenomics	2	BIO/10
○ Medical Device Regulations and Development	3	CHIM/09
○ Pharmacovigilance	2	BIO/14
○ Digital Health and Therapeutics	1	MED/46
○ Model organisms for studying metabolic diseases	2	BIO/10
○ Pharmacogenetics and personalized medicine	3	BIO/18
○ Design and Development of Therapeutic Monoclonal Antibodies	2	MED/04

EXAMS

Exams may be in the form of a written or spoken test, or both. Details on the mode of exam are provided by each professor at the beginning of the course.

Marks are based on the following :

0-17 / 30	FAILED
18-21 /30	PASSED
22-24 /30	GOOD
25-27 /30	VERY GOOD
28-29 /30	EXCELLENT
30 or 30 with honors	OUTSTANDING

CRITERIA TO CALCULATE THE FINAL GRADUATION MARK

The final mark may vary from 66/110 (pass) to 110/110 *cum laude*(outstanding). It will be assigned adding the following:

1. Starting vote: average of marks from exams, expressed on 110 (e.g. 27/30 = 99/110)

2. points awarded to the final report and thesis defense by the **Commission** (7 members + President) **0-8 points**

3. bonus (optional):

a. number of years to obtain the degree: graduation in the

- 1st session, July (end of the second year) **3 points**
- 2nd session, October (end of the second year) **1points**
- any other later session **0 points**

b. Erasmus or other stage in a foreign country (**max 3 points**) calculated according to the following criteria:

b1. Passing exams abroad **1-3 points**

6-11 CFU:	1 point
12-17 CFU:	2 points
> 18 CFU:	3 points

b2. Laboratory training abroad **3 points**

c. For **each exam** passed **with honors**, excluding elective courses: **0.2 points**

The notation "with honors" (cum laude) **may** be given **unanimously** by the Commission to students who have achieved a final score of at least 112/110.

COURSES SCHEDULE 2025-2026

FIRST SEMESTER: September 29, 2025 – December 19, 2025.
SECOND SEMESTER: March 2, 2026– May 22, 2026.

First semester exam session: January 12, 2026 – February 27, 2026
Second semester exam session: June 3, 2026 – September 25, 2026
The detailed *Lessons Schedule* and *Exams Schedule* can be found at
https://biotechnology.uniroma2.it/didactic-area/ .

Courses will be organized as follows (courses common to the two curriculum are in red, [A] Experimental Biotechnology; [B] Clinical research):

FIRST YEAR

FIRST SEMESTER	**CFU**	**SSD**
B. Clinical Research Methodology (2 modules)	6(4+2)	SECS-S/02
Medicinal Chemistry (module of Pharmacology and Medicinal Chemistry)	12(6+6)	CHIM/08
Applied Immunology (2 modules)	6(4+2)	MED/04 - MED/07
Biochemistry of Neurodegeneration: from Basics to Models (module of Cellular Biochemistry of Human Diseases)	6(3+3)	BIO/10
Industrial Biochemistry (2 modules)	12(7+5)	BIO/10 – BIO/11
Nanobiotechnology based Pharmaceuticals (2 modules)	6(4+2)	CHIM/02 - BIO/19
SECOND SEMESTER		
A. Biosensor Technology	6	CHIM/01
A. Microbial Technology	6	BIO/19
A. Genome structure, expression and editing	6	BIO/18
A. Pharmaceutical applications of plant metabolites	6	BIO/04
B. From development and market (2 modules)	6(3+3)	MED/01 + SECS-P/10
B. Physiopathology	6	MED/04
B. Clinical Data Quality management (2 modules)	6(3+3)	MED/09
Pharmacology (module of Pharmacology and Medicinal Chemistry)	12(6+6)	BIO/14
Cellular Biochemistry of Human Diseases (module of Cellular Biochemistry of Human Diseases)	6(3+3)	BIO/06
TOTAL CFU, 1st Year	**66**	

SECOND YEAR

FIRST SEMESTER		
A. Applied Economics	6	SECS-P/06
B. Clinical trials-Regulatory activities	6	IUS/09
Stem Cell Biotechnology	6	BIO/13
Elective courses	10	
Internship and Dissertation	32	
TOTAL CFU, 2nd Year	**54**	
TOTAL CFU	**120**	

TUITION FEES AND SCHOLARSHIPS

Tuition fees at the University of Rome Tor Vergata for the AY 2024/2025 will be based on the student's family income and no extra-fee will be charged for courses taught in English. Non-EU students unable to submit a regular ISEE, will be asked to pay a fixed annual tuition fee. Additional Information is available at the site https://web.uniroma2.it/en/percorso/admissions/sezione/tuition_fees
Fees do not cover the costs of living and study materials.
The Fee for each Academic Year must be paid in three installments. Late enrollment is subjected to penalty fees.
Foreign students and Italian students not resident in Rome may apply for a LAZIODISCO scholarship. Information can be found at http://www.laziodisco.it/

HOUSING
A Housing service is managed by the **Welcome Office**. For information, please write to: housing@uniroma2.it

Students can apply for a room in the University Residence **Campus X**.
The University of Rome Tor Vergata has a University Residence inside the Campus, where Italian and International students can live. The residence provides flats with single rooms where students share a kitchen and toilet. Campus X is a residential structure to be enjoyed, with green areas, study halls, sports facilities, minimarket, canteen, gym and spa.
For further information you can visit: http://internationalstudents.uniroma2.it/ - Section Services or https://www.cx-place.com/

FURTHER BENEFITS
The University of Tor Vergata offers to students the possibility to benefit from a number of discounts in shops, restaurants, gyms and others. Offers can be found at http://agevola.uniroma2.it/

DIRECTIONS
The Department of Biology is located in Via della Ricerca Scientifica 1 (Roma - 00133), outside the ring road "GRA - Grande Raccordo Anulare", in the Building of the Facoltà di Scienze MM.FF.NN (now called MacroArea di Scienze).

By public transportation
Metro + Bus: take the subway line A and get off at the end of the line ("Anagnina" station), take the bus 500 or 046 and get off at the stop "Facoltà di Scienze".

By car
Take the "GRA - Grande Raccordo Anulare", exit to "La Romanina" (exit 19-20), follow the signs to "Tor Vergata - Facoltà di Science MM.FF.NN".

The description of courses offered can be found at the link: https://biotechnology.uniroma2.it/didactic-area/courses-teachers/

Detailed information relating to each course can also be found at the following links:

Planned teaching (didattica programmata) 2025/2026
https://uniroma2public.gomp.it/PublicData?mode=course&iso=ita&uid=c320acc9-c4ef-4385-a696-db868c2421e9

Teaching provided (didattica erogata) 2025/2026
https://uniroma2public.gomp.it/PublicData?mode=classRoom&iso=ita&uid=2833ab2b-e2a8-49e0-9174-6ba4897a7d87