# UNIVERSITA' DEGLI STUDI DI MILANO
# PROGRAMME DESCRIPTION - ACADEMIC YEAR 2020/21
# MASTER DEGREE
## Veterinary Biotechnology Sciences (Classe LM-9)
## Enrolled student until 2019/2020 academic year

| *HEADING* | |
|---|---|
| **Degree classification - Denomination and code:** | LM-9 Pharmaceutical, veterinary and medical biotechnologies |
| **Degree title:** | Dottore Magistrale |
| **Curricula currently available:** | |
| **Length of course:** | 2 years |
| **Credits required for admission:** | 180 |
| **Total number of credits required to complete programme:** | 120 |
| **Years of course currently available:** | 2nd |
| **Access procedures:** | Open, subject to entry requirements |
| **Course code:** | H52 |

## *PERSONS/ROLES*

**Head of Interdepartmental Study Programme**

prof.ssa Gabriella Tedeschi

**Tutors - Faculty**

Prof.ssa Gabriella Tedeschi, Prof.ssa Antonella Baldi, Prof.ssa Federica Cheli, Prof. Fabio Luzi, Prof.ssa Tiziana Brevini, Prof.ssa Lauretta Turin, Prof. Luciano Pinotti, Prof.ssa Chiara Bazzocchi.

**Degree Course website**

https://www.unimi.it/it/corsi/corsi-di-laurea/scienze-biotecnologiche-veterinarie

Via dell'Università, 6 La segreteria riceve su appuntamento tramite sevizio infostudente nei seguenti orari: Martedì h 13:00-15:00 Mercoledì h. 9:00-12:00 Giovedì h. 13:00-15:00 https://www.unimi.it/it/studiare/servizi-gli-studenti/segreterie-infostudenti

## *CHARACTERISTICS OF DEGREE PROGRAMME*

**General and specific learning objectives**

To provide the graduating students with:

a) an adequate training to develop scientific methodologies, to coordinate national and international research activities

b) the expertise in the fields of veterinary biotechnologies, including veterinary microbiology and immunology, animal pathology, diagnostics, infectious and parasitic diseases, zoonosis, pharmacology and toxicology, animals productions and reproduction, genetic improvement and biodiversity preservation, animal nutrition and food safety, development of animal models for biomedical studies, as well as the main rules regulating veterinary biotechnology.

**Expected learning outcomes**

Following what suggested by the Dublin Descriptors, the Master Course of Veterinary Biotechnological Sciences will provide the graduated with the following expertise:

Knowledge and understanding

The graduated in Master course of Veterinary Biotechnological Sciences are supposed to have acquired the theoretical and practical knowledge in the field of biotechnologies applied to veterinary medicine during their bachelor studentship. These qualifications include: molecular diagnostics, the preservation of animal biodiversity by means of applied genetics, the control of human health through the control of the safety of food from animal origin, the control of zoonosis, the development of animal models for human diseases, the study of techniques focused on animal productions and animal reproduction. The graduated in Master course of Veterinary Biotechnological Sciences will integrate this knowledge with those acquired during the present master study, improving their capability to apply their knowledge to multidisciplinary topics. The teaching program will also take advantage of seminars and workshops, provided by experts from different disciplines, who will discuss the last updates in their studying areas.

Applying knowledge and understanding

The graduated in the Master course of Veterinary Biotechnological Sciences will apply their knowledge to specific areas in the field of veterinary biotechnology, such animal nutrition and food safety, animal diseases and diagnostics in the field of pathology, microbiology and immunology, infectious and parasite diseases, zoonosis, veterinary pharmacology and

toxicology, animal production and reproduction, genetic improvement and preservation of biodiversity, development of animal models, management and marketing techniques related to R&D in an industrial frame.

Making judgements

The graduated in the Master course of Veterinary Biotechnological Sciences will develop a skill in making judgments to design and carry out investigations in veterinary and animal science biotechnologies, and close fields as well. Students will be exposed to seminars and workshops aimed at developing this judgment making capability. The final part of the student career will be devoted to the preparation of an experimental master thesis, which might also be carried out in external research laboratories, In Italy or in other countries.

Communication

The graduated in the Master course of Veterinary Biotechnological Sciences will be able to communicate with their peers, the larger scholarly community and with society in general about the area of veterinary biotechnology and in close disciplines to specialist and non-specialist audiences clearly and unambiguously. Their communication ability will be verified at the end of the course, though the evaluation of their master thesis presentation and discussion.

Lifelong learning skills

The graduated in the Master course of Veterinary Biotechnological Sciences will acquire the ability to improve the knowledge in the field of veterinary biotechnology and close disciplines, not limited to the field of animal sciences. The learning skills will be verified through seminars, individual tutoring and the writing of the thesis.

**Professional profile and employment opportunities**

The graduated in the Master course of Veterinary Biotechnological Sciences will find his/her ideal employment profile in the following R&D environments:

- Universities
- Public and private research institutions.
- Pharmaceutical, diagnostic and biotechnological companies
- Food and feed processing companies
- The graduated in the Master course of Veterinary Biotechnological Sciences will also find his/her employment in the management function of Quality control, Clinical and pre-clinical monitoring in the veterinary and human medicine fields, scientific information and sale representative activities, Management of animal breeding and genetic selection activities, control quality in feed and food preparation industries, environmental safety,

**Notes**

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 o 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 December. 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 December 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.

## *EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING 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 30 different 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**

Students of Veterinary Biotechnological Sciences have the opportunity to spend a term (from 3 to 12 months) in the universities with whom the School has developed bi-lateral agreement, which for 2015-2016 Academic Year include The

University of Warmia and Mazury, Oltzyn (Poland), The university of Bonn (Germany), The Autonomous University of Barcelona (Spain), The University of Ljubljana (Slovenia) and the University of Rijeka (Croatia). It is possible to combine courses with a graduating thesis stage, provided that an Internal Tutor (Italian) and external Tutor (from the country where the student will spend his Erasmus + period) are available. ECTS will be acknowledged following the learning agreement signed, as included by bi-lateral agreement between Universities.
The Program of Veterinary Biotechnological Sciences also offers the opportunity for a traineeship regulated by Erasmus + Traineeship program (former Erasmus placement). The program is activated in the frame of a scientific cooperation between a researcher group belonging to the School and others from foreign institution. Erasmus + Traineeship is financed by scholarship from the University of Milano.

**How to participate in Erasmus mobility programs**

How to participate in Erasmus+ mobility programmes

The students of the University of Milan can participate in mobility programmes, which last 3 to 12 months, through a public selection procedure.
Ad hoc commissions will evaluate:
• 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, 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
E-mail: mobility.out@unimi.it
Desk opening hours: Monday to Friday 9 am - 12 noon

***1st COURSE YEAR (disactivated from academic year 2020/21) Core/compulsory courses/activities common to all curricula***

| Learning activity | Ects | Sector |
|---|---|---|
| Anatomical bases and molecular networks in the Central Nervous system and its pathologies | 8 | VET/01, VET/03 |
| Biotechnologies: experimental models in research | 12 | (4) VET/07, (5) AGR/18, (3) AGR/20 |
| Cellular communication and signal transduction | 10 | BIO/10, BIO/09 |
| Ethiopathogenesis of hereditary and parasitic diseases | 6 | VET/06, AGR/17 |
| Molecular epidemiology | 5 | VET/05 |
| Molecular Microbiology | 10 | MED/04, BIO/19, MED/07 |
| Omics | 10 | BIO/10, BIO/18 |
| Total compulsory credits | 61 | |

***2nd COURSE YEAR Elective courses for all curricula***

**In the II year, integrated courses will be activated into modules up to the amount of expected credits ( eight credits). These integrated courses are aimed to offer students the opportunity to further deepen preparation in specific areas of Biotechnological Veterinary Sciences and can be chosen by the students. The acquisition of the eight CFU is subject to passing the related tests by the students, with the vote of thirty. For more information consult the university website www.unimi.it and www.veterinaria.unimi.it.**

| | | |
|---|---|---|
| Biobanking | 8 | (5) VET/09, (3) |

| | | |
|---|---|---|
| | | VET/10 |
| Biomarkers and immunoassays in animal health and nutrition | 8 | (2) AGR/18, (2) BIO/10, (4) VET/05 |
| BIOTECHNOLOGICAL DIAGNOSTIC TOOLS INTO THE CLINICAL MEDICINE OF DOG AND CAT | 8 | (3) VET/08, (3) VET/01, (2) BIO/12 |
| Biotechnologies for innovation and sustainability of animal health and production | 8 | (3) VET/07, (3) AGR/18, (2) VET/06 |
| FROM 3D-CULTURE AND 3D-PRINTING TO ORGANOIDS | 8 | (3) AGR/18, (2) VET/09, (3) VET/01 |
| IMAGING TECHNIQUES IN BIO-MEDICAL RESEARCH | 8 | (2) BIO/10, (6) VET/01 |
| MOLECULAR AND IMMUNOLOGICAL INTERACTIONS IN PARASITOLOGY | 8 | (2) BIO/10, (6) VET/06 |
| MOLECULAR PATHOLOGY AND PARASITOLOGY | 8 | (2) VET/06, (6) VET/03 |
| NANOMATERIALS: APPLICATIONS AND EFFECTS | 8 | (3) VET/07, (2) VET/02, (3) VET/05 |
| VACCINOLOGY | 8 | (2) AGR/18, (6) VET/05 |

## *Further elective courses common to all curricula*

**MANDATORY ACTIVITIES COMMON TO ALL CURRICULA.**

**The student has to obtein 4 cfu as indicated below:**
**- n. 2 cfu for further training activities related to stage, orientation and computer skills**
**- n. 2 cfu for further languages skills**

| | | |
|---|---|---|
| English proficiency B2 (2 ECTS) | 2 | ND |

## *End of course requirements common to all curricula*

| | | | |
|---|---|---|---|
| Final examination | | 21 | NA |
| | Total compulsory credits | 21 | |

## *ACTIVE CURRICULA LIST*

Gametes, cells, tissues: applications for reproduction and therapy Course years currently available: 2nd
Advanced techniques for disease control and biosafety Course years currently available: 2nd

### *CURRICULUM: [H52-D] Gametes, cells, tissues: applications for reproduction and therapy*

**Qualifying Training Objectives**

To investigate biotechnological aspects related to assisted animal reproduction, the application of stem cells in the biotechnological field and the development of alternative methods to animal experimentation.

**Skills acquired**

Knowledge of principles and techniques in assisted animal reproduction, the use of stem cells in the biotechnological field and the development of alternative methods to animal experimentation.

**Professional profile and employment possibilities**

Graduates from the master degree programme in Veterinary Biotechnology Sciences can pursue careers in the following professional spheres. Scientific research and technological development in:
public and private universities;
public facilities (the National Health Institute, the National Research Council (CNR), the National Environment Agency, Experimental Veterinary Preventive Medicine Institutes, Research Institutes);
the pharmaceutical, diagnostic and biotechnological industries;
the food, food processing and fodder industries;
public and private pre-clinical research facilities in the medical and veterinary fields;
the management of quality control;
clinical monitoring activities;
regulation, management and biotechnological corporate creation procedures in the public and private spheres.
Graduates can assume managerial and consulting roles in the following fields:
therapeutic, with particular reference to the development and trial of innovative products with therapeutic capacities for animal pathology and the use of animal models for biomedical studies and cellular therapy;
patent design and production in the health field;
diagnostics, through the management of molecular analysis technologies and cellular biotechnologies applied to the health and environment fields;
animal reproduction, for the preservation of animal biodiversity and species at risk of extinction;
quality control for foods of animal origin in the food industry;
quality control for fodder and products in the fodder industry;
technological research and design for the selection and management of animal species;
genetic variability and animal husbandry control in relation to the preservation of biodiversity;
the design and development of biotechnologies with clinical and therapeutic uses in a multidisciplinary context;

technical and scientific pharmaceutical information;
the valuation and control of environmental security.

| *2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Gametes, cells, tissues: applications for reproduction and therapy* | | | |
|---|---|---|---|
| **Learning activity** | | **Ects** | **Sector** |
| Biotechnology of reproduction | | 6 | VET/10 |
| Cellular regeneration techniques | | 7 | VET/01 |
| Functional genomics and the molecular basis of differentiation | | 8 | VET/06, AGR/17 |
| In Vitro Model Technologies | | 5 | VET/07, VET/02 |
| | Total compulsory credits | 26 | |

***CURRICULUM: [H52-E] Advanced techniques for disease control and biosafety***

**Qualifying Training Objectives**

To investigate biotechnological aspects relevant to disease control and nutritional safety, research strategies in the field of infectious diseases, parasitology, health and animal production.

**Skills acquired**

Knowledge of principles and techniques for the control of food safety diseases, infectious diseases, parasitology, health and animal production.

**Professional profile and employment possibilities**

Graduates from the master degree programme in Veterinary Biotechnology Sciences can pursue careers in the following professional spheres. Scientific research and technological development in:
public and private universities;
public facilities (the National Health Institute, the National Research Council (CNR), the National Environment Agency, Experimental Veterinary Preventive Medicine Institutes, Research Institutes);
the pharmaceutical, diagnostic and biotechnological industries;
the food, food processing and fodder industries;
public and private pre-clinical research facilities in the medical and veterinary fields;
the management of quality control;
clinical monitoring activities;
regulation, management and biotechnological corporate creation procedures in the public and private spheres.
Graduates can assume managerial and consulting roles in the following fields:
therapeutic, with particular reference to the development and trial of innovative products with therapeutic capacities for animal pathology and the use of animal models for biomedical studies and cellular therapy;
patent design and production in the health field;
diagnostics, through the management of molecular analysis technologies and cellular biotechnologies applied to the health and environment fields;
animal reproduction, for the preservation of animal biodiversity and species at risk of extinction;
quality control for foods of animal origin in the food industry;
quality control for fodder and products in the fodder industry;
technological research and design for the selection and management of animal species;
genetic variability and animal husbandry control in relation to the preservation of biodiversity;
the design and development of biotechnologies with clinical and therapeutic uses in a multidisciplinary context;
technical and scientific pharmaceutical information;
the valuation and control of environmental security.

| *2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Advanced techniques for disease control and biosafety* | | | |
|---|---|---|---|
| **Learning activity** | | **Ects** | **Sector** |
| Biotechnology applied to animal health and production | | 5 | AGR/19 |
| Experimental Nutrition | | 5 | AGR/18 |
| Molecular Virology | | 8 | VET/03, VET/05 |
| Research strategies and methodologies applied to disease study and control | | 8 | (5) VET/06, (3) VET/05 |
| | Total compulsory credits | 26 | |