



UNIVERSITÀ DEGLI STUDI DI TORINO

MASTER IN  
**CELLULAR AND MOLECULAR BIOLOGY - BIOLOGIA  
CELLULARE E MOLECOLARE**

CLASS: LM-6



**DIDACTIC REGULATION  
ENROLLMENT A.Y. 2016-17**

**Master functions and structure**

1. The Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare, LM-6 class, is founded at the University of Turin. It is organized according to the rules of the Master in Biology reported in the Ministerial Decree March 16th, 2007 (G.U. n. 155, 7-6-2007 Ordinary Supplement n. 153/G.U. n. 157, 7-9-2007 Ordinary Supplement n. 155).
2. The Master in Cellular and Molecular Biology-Biologia Cellulare e Molecolare refers to the Department of Life Sciences and System Biology and to the Department of Clinical and Biological Sciences at the University of Turin, as well as to the School of Nature Science. The Department of Life Sciences and System Biology is the principal reference.
3. The competent didactic structure is the Board of the Master in Cellular and Molecular Biology. In addition, there is a Advisory Board to which the ordinary management is delegated. The Board also has deliberative powers on students' matters.
4. The present Regulation (that conforms to the guidelines approved by the Academic Senate) regulates the didactic organization of the Master for every aspect not defined by the Academic Didactic Rules, the Department of Didactic Rules and the Academic Rules for relationship among Schools, Departments and Degree Courses. Master didactic organization, together with the specific educational objectives and the general schedule of activities, written according to the guidelines of the Ministry Data Bank, is reported as Attachment 1 (RAD), that

integrates the present Regulation. The Board of the Reference Departments holds the possibility to regulate specific aspects of the didactic organization through specific rules.

5. The present Regulation applies to the cohort enrolled for the first time in the academic year (A.Y.) 2016-17.

6. The premises and the logistic structures supporting both lectures and laboratory activities normally pertain to the Reference Departments and/or to the School of Nature Sciences. However, there is the possibility that some courses can be loaned or held by other Masters of the University of Turin. Teaching and training activities could be carried out in other didactic and scientific structures of the University of Turin or in external institutions, national or international, public or private, provided the existence of specific agreements.

## **ARTICLE 1**

### **Specific educational objectives, professional and working prospects**

The objective of the Master in Cellular and Molecular Biology - *Biologia Cellulare e Molecolare* is to prepare Biologists endowed with a profound and integrated knowledge of the biological systems, going from the molecular and cellular level to complex organisms. Such Biologists will be able to spend their knowledge in specific areas of applied biology such as biotechnology, biomedicine and neurosciences.

People graduated at the Master in Cellular and Molecular Biology - *Biologia Cellulare e Molecolare* are allowed to perform professional and managerial activities recognized by the laws in force as competences of the Biologist. Graduated in Cellular and Molecular Biology share the specific areas of intervention with people possessing the Bachelor Degree (class L-13). However, the former can reach a higher level of decisional autonomy than the latter in view of their wide cultural background and of their high career brief.

The specific educational objectives of the Master in Cellular and Molecular Biology - *Biologia Cellulare e Molecolare* aim to provide students with appropriate cultural tools allowing:

- the enrollment in the 'A' Biologist National Register, after passing the State exam;
- the introduction to professional activities and projects in basic and applied research institutes, in private and public biomedical laboratories, in pharmaceutical companies, and also to activities aimed at promoting and developing scientific and technological innovation, and management and design of molecular and cellular technologies;
- the entry into pertinent PhD Schools, in Italy or abroad;
- the entry into Specialty Schools pertaining to the School of Medicine, possibly opened to people graduated in LM-6 class.

The Master course will be organized with a common part and with three different *curricula*. The common part includes activities aimed to enhance the education in fundamental biomolecular disciplines such as biochemistry, molecular biology, cell biology, cell physiology, microbiology, and also the knowledge about mathematical and computer tools. Educational

activities specific for each curriculum (**biomolecular**, **biomedical** and **neurobiological**) will allow the students to deepen their knowledge and skills respectively in:

- biophysics, molecular structure, bioinformatics and system biology;
- in the areas of human anatomy, medical genetics and general pathology, with particular reference to the underlying mechanisms of diseases;
- in the areas of neuroanatomy, molecular and developmental neurobiology, neurophysiology.

English will be the official language of the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare, in order to allow the attendance by foreign students and to endow Italian students with a professional formation opened to international working and/or scientific communities.

Significant competences in advanced innovative and/or experimental methodologies will be provided by both curricular teachings and the large amount of time dedicated to the experimental Master thesis. This latter can be developed both in Italy or abroad, in view of internationalization agreements and student outgoing mobility.

On the whole these activities will provide the students with a good command of the scientific method of investigation, conferring a good degree of autonomy in planning and execution of scientific experiments, as well as in the interpretation, discussion and presentation of results.

Some courses also present and discuss bioethical issues as well as the impact on both society and environment of the proposed methodologies.

Educational activities can include lectures, laboratory activities, seminars. Training activity, when scheduled, will consist in spending a period of time in research, industry or hospital laboratories.

The Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare conforms to the national tuning criteria defined by the Italian University Corporation of Biologists.

### ***Expected learning results, expressed as Degree European Descriptors***

#### ***Knowledge and understanding***

Graduates in Cellular and Molecular Biology should acquire deep theoretical and practical knowledge in the cellular-molecular field, in both physiological and pathological states. In particular, during the common part of the educational route they will achieve competences in biochemistry, cell and molecular biology, pharmacology, physiology. They will also become able to deal with both statistic and IT tools necessary for experimental data collection and analysis. In the subsequent organization into *curricula*, students will address specific topics, from both the theoretical and applicative point of view, in the biomolecular, biomedical or neurobiological field.

### ***Applying knowledge and understanding***

Graduates in Cellular and Molecular Biology will be able to apply multidisciplinary and specialist knowledge in the research field, both basic and applied, or in activities related to production and/or services, with particular reference to the biomolecular, biotechnological, biomedical or neurobiological field. They will also be able to manage with professional activities implying advanced, innovative or experimental methodologies. Such abilities will be acquired through common educational activities (theory and practice), such as bioinformatics, quantitative and qualitative analysis of biological macromolecules, growth and manipulation of eukaryotic and prokaryotic cells, morphological and functional microscopy analysis. This educational route will be associated with specific curricular activities and with the Master thesis preparation.

The acquisition of the above competences will be frequently verified by means of:

- reports on practical activities (individual or teamwork);
- analysis, presentation and discussion of data published in the literature;
- written tests (open and/or closed questions) and/or interviews (ability to approach and discuss problems).

Finally, the activities developed to prepare the Master thesis (experimental results and thesis writing up), and its presentation and discussion with the Degree Board will be highly important.

### ***Making judgments***

On the whole, independently from the specific *curriculum* chosen, the educational program in Cellular and Molecular Biology confers the ability to integrate experimental and/or analytical data, obtained autonomously by the scientific literature, with the knowledge acquired in the biomedical, biomolecular or neurobiological field, in order to provide conscious judgments/evaluations regarding the professional activity. Such skill will be verified during the educational program by evaluating: i) the ability to discuss specific topics, in group or with teachers; ii) workshops, reports and data/paper presentations; iii) preparation, presentation and discussion of the Master thesis.

### ***Communication skills***

The educational program in Cellular and Molecular Biology is organized to provide the ability to:

- well fit in teams, also multidisciplinary, assuming managerial responsibilities;
- elaborate data by means of IT tools, present and discuss them, also in English, oral or written;
- communicate biomolecular, biomedical or neurobiological knowledge, also in English, at both divulgative or specialist level.

Such skills are acquired also because: i) teaching in the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare is provided in English; ii) analysis and presentation of

scientific papers is part of the profit evaluation of several courses; iii) in some courses teaching activity includes the preparation of projects and reports; iv) reports of the experimental activity regarding the Master thesis are regularly prepared and discussed.

### ***Learning skills***

By means of activities included in several courses (bioinformatics laboratories, seminars, discussion of recent scientific papers), and of individual activities involved in tests and Master thesis preparation, graduates in Cellular and Molecular Biology acquire the following skills:

1) to use IT tools to access and manage with English scientific literature and with gene, molecular and structural banks; 2) to autonomously follow the development of advanced technologies and their applications; 3) to select and critically evaluate information in order to allow a continuous knowledge update.

### **Occupational and professional outlets**

Graduates in Cellular and Molecular Biology can be employed in work and research environments where the need of well trained operators endowed with solid theoretical and applicative basis of cell and molecular Biology is rapidly increasing. In particular, graduates in Cellular and Molecular Biology will be able to perform:

- research activity in the biomolecular, biomedical or neurobiological field, both basic and applied, in laboratories pertaining to Universities, IRCCs, pharmaceutical industries, or other public institutions;
- professional activity in public and private laboratories for biological, microbiological, sero-immunological, genetic, biochemical and cytological tests, together with activities related to the identification of infective agents, to the control and activity of antibiotics, hormones, sera and vaccines, and to biomolecular and quality control;
- activities related to the promotion and development of scientific and technological innovation in the field of cellular and molecular biology, and to the design and management of cellular and biomedical technologies and biotechnologies.

Finally, the theoretical-practical specialist formation in cellular and molecular biology allows the enrollment in the 'A' section of the Biologist National Register, after passing the State exam, as well as the enrollment in PhD Schools, in Italy or abroad, and in the Specialty Schools in the biomedical field possibly opened to LM-6 class graduates, which are needed to the managerial career in public laboratories.

### **The Master forms to the profession of:**

Biologist, Researchers and Technicians in Biological Sciences.

## ARTICLE 2

### Admission requirements and verification modalities

1. Students willing to enroll in the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare must possess the following requirements:

- **Bachelor or University Degree** obtained with a three year course, or equivalent title obtained abroad.
- **Minimum curricular requirements (see comma 3)**
- **Adequate personal background (see comma 4)**. The enrollment without an appropriate background is not allowed.

2. The admission to The Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare is **not programmed**.

3. **Curricular requirements:** To be admitted to the test, candidates must possess at least 60 ECTS of basic/characterizing activities described in the Ministerial Table of L-13 class of degree (Biological Sciences), i.e. in one or more of the following disciplines (SSD): BIO/01, BIO/02, BIO/03, BIO/04, BIO/05, BIO/06, BIO/07, BIO/09, BIO/10, BIO/11, BIO/12, BIO/14, BIO/16, BIO/18, BIO/19, CHIM/01, CHIM/02, CHIM/03, CHIM/06, FIS/01-08, INF/01, MAT/01-09, ING-INF/05, MED/04, MED/42.

4. **Adequate personal background.** Irrespective from possession of the curricular requirements, tment to the Master depends on getting through the admission test aimed to verify the adequate personal background about several topics (see ***Syllabus***). The test will be written, normally followed by an interview.

**Syllabus.** Topics included in the admission test (written and interview) are indicated below. In addition, some textbooks and websites are provided to candidates willing to deepen their knowledge.

**Anatomy and Physiology:** Structure and function of the cardiovascular, digestive, respiratory, excretory, genital endocrine and nervous systems. Structure and function of biological membranes. Diffusion fluxes.

#### **Reference material:**

- W. Bemis, W.F. Walker, K. Liem, 'Functional anatomy of the vertebrates: an Evolutionary Perspective', 4<sup>th</sup> edition, 2008, Thomson Brooks/Cole, or equivalent.
- K. Saladin, 'Human Anatomy', 3<sup>rd</sup> edition, 2013, McGraw-Hill, or equivalent.
- B. Alberts et al., 'Essential Cell Biology', 2013, 4<sup>th</sup> edition, Garland, or equivalent.
- P. Willmer et al. 'Environmental Physiology of Animals', 2004, 2<sup>nd</sup> edition, Wiley-Blackwell, or equivalent.

**Biochemistry:** Structure and function of proteins (allosteric regulation). Enzymes: basic concepts and mechanisms of enzymatic catalysis. Principles of bioenergetics and metabolic pathways. Basic methods for purification and characterization of proteins.

Reference material: one of the following books

- D.L. Nelson, M.M. Cox, 'Lehninger, Principles of Biochemistry', 2012, 6<sup>th</sup> edition, W.H. Freeman
- C.K. Mathews, K.E. van Holde, Applin D.R., Anthony-Cahill S.J. 'Biochemistry', 2012, 4<sup>th</sup> edition, Pearson.
- J.M. Berg, J.L. Tymoczko, L. Stryer 'Biochemistry', 2012, 7<sup>th</sup> edition, W.H. Freeman
- D. Voet, J.G. Voet, C.W. Pratt: 'Fundamentals of Biochemistry', 2012, 4<sup>th</sup> edition, Wiley.

**Cell Biology:** Elements of cell communication and signal transduction. Cell junction and adhesion. Regulation of the cell cycle. Cell death and survival. Protein trafficking. Basic cell culture techniques.

Reference material:

- B. Alberts et al., 'Essential Cell Biology', 2013, 4<sup>th</sup> edition, Garland, or equivalent.
- <http://www.ncbi.nlm.nih.gov/books/?term=cell+biology>
- <https://www.youtube.com/watch?v=kbhQ29vRqs4>
- <https://www.youtube.com/watch?v=pP0xERLUhyc>

**Cytology and Histology:** Structure and function of eukaryotic cell (plasma membrane, organelles, mitosis, meiosis). General characteristics and functions of the main tissues (epithelial, connective, muscular, nervous). Immunohistochemistry.

Reference material:

- J. Kerr, 'Functional Histology', 2010, 2<sup>nd</sup> edition, Elsevier, or equivalent.
- R. Colombo, E. Olmo, 'Biologia - cellula e tessuti', 2014, Edi Ermes, or equivalent.

**English Language:** Common European Framework (CEF) B1 level.

**Laboratory skills:** Preparation of solutions. Basic knowledge of methods for solution and dilution. Notions of laboratory safety.

Reference material:

- [https://www.youtube.com/watch?v=UJPv2JVO\\_9Y](https://www.youtube.com/watch?v=UJPv2JVO_9Y);
- <https://www.youtube.com/watch?v=A2YyIo8vSCA>;
- [https://www.youtube.com/watch?v=MG86IFZi\\_XM](https://www.youtube.com/watch?v=MG86IFZi_XM);
- <https://www.youtube.com/watch?v=v6dnEp58mVk>;
- <https://www.youtube.com/watch?v=8p8c-BfWZVY>

**Microbiology:** Structure and function of the prokaryotic cell. Microbial metabolism. Microbial growth. Microbial genetics. Basic knowledge of methods for cultivation, quantification, and identification of bacteria. Viruses: structures and replication strategies.

Reference material:

- Brock 'Biology of Microorganisms', 2014, 14<sup>th</sup> edition, Pearson.

**Molecular Biology and Genetics:** DNA and RNA structures. Structure of genomes. Replication, mutation and DNA repair. Transcription, RNA processing and protein synthesis. Principles of gene expression regulation. Basic recombinant DNA techniques. Genetic recombination and heredity. Fundamentals of population genetics. Basic knowledge of bioinformatics.

Reference material: one of the following books

- R. Raven, G. Johnson, K. Mason, J. Losos, S. Singer, 'Genetica e Biologia molecolare', 2012, Piccin, or equivalent.
- J.D. Watson et al. 'Recombinant DNA: Genes and Genomes — A Short Course', 3<sup>rd</sup> edition, Cold Spring Harbor Laboratory Press
- T.A. Brown, 'Introduction to Genetics: A molecular Approach', 2011, Garland Science.
- <https://www.hhmi.org/biointeractive>

The admission test will be in September (two dates), in public classrooms, in the presence of the Admission Committee, including at least three teachers belonging to the Master.

5. The test will be in English.

6. If the candidate is not in the possession of the curricular requirements indicated above (comma 3), she/he will have the opportunity to obtain the lacking ECTS by enrolling to single courses and passing the relative exams before asking admission to the test.

7. Within the terms fixed by the Academic Senate, students getting their degree in the year can enroll during the same A.Y.

#### **ARTICLE 4**

##### **Master duration**

1. Normal duration is two years. To get the Master Degree students must acquire at least 120 ECTS, according to the rules displayed in the file of the training activities and ECTS relative to the biennial curriculum included in the Master Didactic Regulation, as ordered in the RDA.

2. The mean amount of total learning engagement per year of a full time student is 60 ECTS. However, students can enroll part-time, according to the rule fixed by the University of Turin.

3. ECTS of each subject are acquired by the student after successfully passing the exam. Learning verification must comply with the modality described in the RDF as well as in the Art. 7 of the present Didactic Regulation, according to the University Didactic Regulation and with the rules emanated by the Reference Departments.

4. People enrolled in the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare do not lose the 'student' status. Career can be reactivated after prolonged interruption, provided that the Master Board certifies that the ECTS obtained before the stop are not obsolescent. Anyway, if the final degree is not obtained within three times the normal duration of the Master (6 years), even in the absence of prolonged interruptions, ECTS obsolescence is evaluated by the Board.

#### **ARTICLE 5**



### **Training activities, courses, curricula, teachers**

1. The Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare is organized into an initial part (I year), common to the three curricula, followed by courses specific for each curriculum (Biomedical, Biomolecular, Neurobiological), in the II/III/IV semesters.
2. Starting from A.Y. 2015-16, all the courses of the Master are taught in English.
3. Study planning, including the organization in curricula is described in the Attachment 2, updated every year.

Training activities in the Master are distributed into two periods (semesters) of 14-15 weeks, followed by a period of 5-6 weeks for exams. Activity schedule is reported in Table 1.

**Table 1. Training activity distribution in the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare.**

#### **I YEAR - I semester – Curricula BIOMEDICAL and BIOMOLECULAR**

<b>Activity</b>	<b>Course</b>	<b>SSD</b>	<b>Field</b>	<b>ECTS</b>
B	Advanced Cell Biology and Biotechnology	BIO/06	Biodiversity and environmental disciplines	9
B	Virology	BIO/19	Biomolecular disciplines	6
B	Cell Physiology	BIO/09	Biomedical disciplines	6
C	Bioinformatics	INF/01	Related and integrative activities	6

#### **I YEAR - I semester – Curriculum NEUROBIOLOGICAL**

<b>Activity</b>	<b>Course</b>	<b>SSD</b>	<b>Field</b>	<b>ECTS</b>
B	Advanced Cell Biology and Biotechnology	BIO/06	Biodiversity and environment disciplines	9
B	Neuroanatomy and Imaging (Neuroanatomy module)	BIO/16	Biomedical disciplines	9
B	Cellular Neurobiology	BIO/06	Biodiversity and environmental disciplines	5
C	Bioinformatics	INF/01	Related and integrative activities	6

**I YEAR - II semester - Curricula BIOMEDICAL and BIOMOLECULAR**

Activity	Course	SSD	Field	ECTS
B	Advanced Molecular Biology	BIO/11	Biomolecular disciplines	9
B	Metabolic Biochemistry	BIO/10	Biomolecular disciplines	6
B	Oncology and Molecular Pathology	MED/04	Biomedical disciplines	6
B	Molecular Pharmacology	BIO/14	Biomedical disciplines	6

**I YEAR - II semester - Curriculum NEUROBIOLOGICAL**

Activity	Course	SSD	Field	ECTS
B	Advanced Molecular Biology	BIO/11	Biomolecular disciplines	9
B	Developmental Neurobiology	BIO/06	Biodiversity and environmental disciplines	6
B	Oncology and Molecular Pathology	MED/04	Biomedical disciplines	6
B	Molecular Pharmacology	BIO/14	Biomedical disciplines	6
B	Neuroanatomy and Imaging (Imaging module)	BIO/16	Biomedical disciplines	4

**I YEAR - I semester – Curriculum BIOMEDICAL**

Activity	Course	SSD	Field	ECTS
B	Human Anatomy	BIO/16	Biomedical disciplines	6
B	Immunopathology and Physiopathology	MED/04	Biomedical disciplines	6
C	Medical and Cancer Genetics	MED/03 MED/08	Related and integrative activities	6+2

**II YEAR - I semester - Curriculum BIOMOLECULAR**

Activity	Course	SSD	Field	ECTS
C	System Biology	FIS/02 INF/01	Related and integrative activities	6
B	Structure of Macromolecules and Proteomics	BIO/10	Biomolecular disciplines	6

**II YEAR - II semester - Curriculum BIOMOLECULAR**

Activity	Course	SSD	Field	ECTS
B	Biophysics	BIO/09	Biomedical disciplines	6

#### Other training activities - Curricula BIOMEDICAL and BIOMOLECULAR

Activity	Course	SSD	Field	ECTS
D	Optional Courses		Student choice	8
E	Thesis		Final exam	39
F	Other Activities Training		Further training activities	1

#### II YEAR - I semester - Curriculum NEUROBIOLOGICAL

Activity	Course	SSD	Field	ECTS
B	Structure of Macromolecules and Proteomics	BIO/10	Biomolecular disciplines	6
B	Neurophysiology	BIO/09	Biomedical disciplines	6

#### II YEAR - II semester - Curriculum NEUROBIOLOGICAL

Activity	Course	SSD	Field	ECTS
B	Cognitive Neuroscience	PSI-02	Related and integrative activities	6

#### Other training activities - Curriculum NEUROBIOLOGICAL

Activity	Course	SSD	Field	ECTS
D	Optional Courses		Student choice	10
E	Thesis		Final exam	35
F	Other Activities Training		Further training activities	1

### ARTICLE 6

#### Training activity typology

1. Didactic activities are organized in courses, within two didactic periods (semesters), approved by the Master Board and published in the Student's Guide (Manifesto degli Studi). Course duration and organization in different modules is fixed according to suggestions of the Reference Departments and of the School of Nature Science. Didactic activities will follow a

calendar decided on a per year basis (see Art. 7, comma 6), within the teaching periods fixed according to Art. 23 comma 1 of the University Didactic Regulation.

2. The ECTS measures learning work required to a student according to decree 87/327/EEC, June 15, 1987), and corresponds to 25 hours of training activity. One ECTS is normally equivalent to:

- 8 h lectures + 17 h personal study, or
- 14-16 h single place practice + 9-11 h personal study, or
- 14-16 h laboratory practice with data elaboration + 9-11 h personal study, or
- 25 h group practice or laboratory practice without data elaboration.

3. In addition to the normal training activities, the Master can organize other activities, external stages and laboratories, in cooperation with public or private institutions in Italy or abroad; such additional activities must be approved by the Master Board and must be under the direct responsibility of a teacher of the Master. The resulting ECTS must be fixed by the Master Board.

4. Students of the Master can achieve acknowledgment of traineeships, stages, etc., provided they are coherent with the objectives of the Master, up to 30 ECTS.

5. In view of a growing integration with Universities in Italy and abroad, there is the possibility to replace training activities of the Master with other disciplines taught in other national or international Universities, under the mark of international agreements, interuniversity conventions, or specific agreements proposed by the Master and approved by the Board of the Reference Departments or of the School of Nature Science.

## **ARTICLE 7**

### **Exams and other verifications of student training**

1. A conclusive test, in English language, to ascertain student training is required at the end of every didactic activity. The test for training activities organized into modules is unique and not split into the different modules. In case of integrated verifications among different courses, the final mark derives from the weighed mean of the marks obtained in every module, independently from the success in the single module test. By passing the exam the student acquires the ECTS attributed to the course.

2. The exams consist in a written test with multiple choice questions and at least one open question, that can be followed, at student's choice, by an oral exam. Modality of this final evaluation and the possibility of *in itinere* verifications are declared every year by the responsible teacher at the beginning of the specific didactic activity. Evaluation modality must be the same for each student, and must conform to what declared at the beginning of the A.Y.
3. Exam period is fixed at the beginning of every A.Y.
4. Exams begin at the end of the specific courses.
5. Exam calendar provides up to 5 calls, distributed throughout the A.Y. Calls are up to 3 for courses not activated in the A.Y.
6. Didactic activity calendar (lectures and exams) is fixed on a per year basis by the Board of the Reference Departments (or the School of Nature Science), as proposed by the Director, following suggestions from the Consultive Paritetic Committee of the Master and the teachers directly involved.
7. Exam and lecture calendar, as well as every other didactic activity and teacher availability are widely disseminated with large advance.
8. Should an evaluation date or a didactic activity be moved, teacher must communicate the change to students as well as to the responsible of the didactic structure as soon as possible, according to the rules currently in force.
9. Once published, exam dates cannot be anticipated; if necessary, the day of evaluation, the teacher fixes a calendar to split candidates into groups.
10. The interval between two different evaluations for the same subject is at least 10 days.
11. Evaluation committees are nominated by the Director of the department or, as a delegate, by the President of the Master. They include at least two members and are chaired by the official teacher of the course or by a delegate. If necessary, and if the components are enough, there is the possibility to work with sub-committees. Every student has the possibility to be evaluated by the committee chairmen. Additional committee members can be other professors, assistant professors, or experts in the field. These latter must be authorized by the Reference Department Board following a suggestion by the Master Board.
12. Students can try the evaluation step for every course no more than three times in the A.Y.
13. The committee chairmen informs the student about the evaluation before the official announcement. Until the result is not announced, the student has the right to withdraw without any curricular consequences. In any case the presence of the student to the evaluation test must be registered.
14. If required, working students are taken into consideration in preparing the list of candidates for the evaluation test.
15. Evaluation mark is expressed as thirtieths. The exam is passed with at least 18/30. If final mark is 30/30, the committee can decide to give a *cum laude* evaluation
16. Evaluation tests are public, the final mark announcement is public as well.

## ARTICLE 8

### Final exam

1. After passing all the verifications of the training activities included in the study planning and acquiring 120 ECTS, included those dedicated to the Master thesis, the student, independently from the number of years since enrollment, is admitted to the final exam, consisting in the public discussion, in front of a judging committee, of a Master thesis in Cellular and Molecular Biology.
2. The Master thesis is a dissertation written in English, developed by the candidate. It must be organized according to the rules accepted by the international scientific community, describing in details and conformingly to the scientific standard: the state of the art of the selected topic, the scientific problem addressed, the experimental approach adopted, the methodology used and the results obtained. The thesis must include a discussion of the results and a reference section. The modality of organization and presentation of the Master thesis are published on the Master website ([http://cmb.campusnet.unito.it/do/home.pl/View?doc=Icon\\_Thesis.html](http://cmb.campusnet.unito.it/do/home.pl/View?doc=Icon_Thesis.html)).
3. Master thesis preparation. On the whole the necessary training activity (experimental work, preparation and presentation of the Master thesis) corresponds to 35 ECTS (875 h) for the Neurobiological curriculum and to 39 ECTS (975 h) for the curricula Biomedical and Biomolecular. The experimental work must be developed in a field coherent with the objectives of the Master, to be performed in laboratories pertaining to a University Department or to external entities, national or international, public or private, provided the existence of an agreement with the University of Turin. The experimental activity is under the responsibility of a teacher of the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare or a teacher of another Master, belonging to a SSD included among the 'characterizing' or the 'related and integrative disciplines' of the Master. Such a teacher, defined *Supervisor*, is responsible for the research activity developed by the student. The status of Supervisor for a teacher of another Master and not belonging to one of the above mentioned SSDs must be evaluated and approved by the Consultive Paritetic Committee of the Master.
3. Master thesis evaluation. The final evaluation of student's career will take into account the marks obtained in both the single courses and the Master thesis. The judging committee, composed by at least 7 teachers, will give to one of these members the duty of *Examiner*, in charge of evaluating the scientific level of the thesis. This latter will be discuss by the candidate in English or Italian, in a public dissertation, in the presence of the judging committee. The evaluation will be expressed as one hundred and tens. Taking into account both the Supervisor and the Examiner opinions, the committee will give a mark from 0 to 10. Students who reach or go over 110/110, and are endowed with a curriculum including at least three exam marks *cum laude*, or reach a total point of at least 115 in the absence of *cum laude* marks will receive a *summa cum laude* evaluation. In addition, but only in the presence of a *summa cum laude* mark, with a unanimous vote, the committee can confer the honorable

mention to the excellent study career, or the printing dignity (through the publication on the Master website of the thesis abstract) to recognize the excellent quality of the scientific work presented.

## **ARTICLE 9**

### **Enrollment and attendance to single courses**

1. If in the possession of requirements to enroll in the Master in Cellular and Molecular Biology - Biologia Cellulare e Molecolare, or if already graduated, a student can enroll in single courses among those offered by the University of Turin, following the terms fixed in the Student Rules of the University of Turin.

## **ARTICLE 10**

### **Propedeutics, duty of attendance**

1. The existence of propedeutics are published every year on the Student's Guide (Manifesto degli Studi).
2. Attendance to practice exercises is due for at least 70% of total time. As for further training activities, attendance is required for 100% of total time. Training activities related to the Master thesis are certified by the Supervisor. Duty of attendance for each course is declared in the Student's Guide (Manifesto degli Studi).
3. Modalities and verification of attendance, if present, are defined on a per year basis and communicated to the students before the beginning of the courses by means of the Student's Guide (Manifesto degli Studi).

## **ARTICLE 11**

### **Career planning**

1. Every year the Master Board fixes in the present Didactic Regulation, as well as in the Student's Guide (Manifesto degli Studi), the suggested training route, leaving place to student's own choices.
2. The student presents her/his career planning within the obligations reported in the Ministerial Decree of the LM-6 class, with the modalities indicated in the Student's Guide (Manifesto degli Studi).
3. The career planning can be organized taking into account a period longer than normal if the student is part-time, or shorter than normal if student's marks in the previous A.Y. are excellent.

4. The career plannings that do not conform to the suggested route, but conforming to the didactic regulation, are submitted for approval to the Master Board.
5. Board decisions (see previous comma 4) are taken at least 40 days before the deadline to present the career planning.

## **ARTICLE 12**

### **ECTS acknowledgment in case of move, transfer and second degrees**

1. Unless otherwise provided, the Master Board submits to Board of the reference Departments the acknowledgment of ECTS and academic degrees obtained in other Universities, also within exchange programs. As for the acknowledgment of exams passed in Masters different from the one in Cellular and Molecular Biology - Biologia Cellulare e Molecolare of the University of Turin, in view of students' transfer from another Master or another University, they will be validated by the Master Board. In particular, the type of training activity, the field, the discipline and the number of ECTS obtained, the year in which the student is admitted will be clearly defined. If the exams are perfectly equivalent, this must be specifically certified; if necessary, an interview to ascertain the knowledge own by the student can be required. If ECTS are not acknowledged, the underlying reasons will be explained. At least 50% of the owned ECTS will be acknowledged to students coming from other Masters of the LM-6 class.
2. Maximum number of acknowledgeable ECTS depends on the ECTS partition fixed by the Master Didactic Regulation.
3. As for exams not included in the disciplines indicated in the Master Didactic Regulation, or exceeding the limits reported in the above comma 2, the student can ask the acknowledgment of a maximum of 12 ECTS as «training activities chosen by the student».
4. ECTS defined as "Further training activities" (D. M. 270/04, art. 10, c. 5, d), can be acknowledged in a maximum of 20.
5. Unless if coming from other LM-6 Masters, the number of ECTS acknowledged cannot be above 30.
6. If the student is already in the possession of a Master Degree, ECTS acknowledgment will be examined and approved by the Consultive Paritetic Committee of the Master.

## **ARTICLE 13**

### **Teachers**

- A. Teachers of the Master are indicated in Attachment 3, updated every year.
- B. Reference Teachers (Directorial Decree 06/10/2008, n. 61, provided on the basis of the teachers actually available, to be updated every year):



MARCO BOTTA  
PAOLA COSTELLI  
MICHELE DE BORTOLI  
GIOVANNA DI NARDO  
CARLO FERRETTI  
GIOVANNA GAMBAROTTA  
CLAUDIA GIACHINO  
GIORGIO GRIBAUDO  
LUCA MUNARON

## **ARTICOLO 14**

### **Orientation e Tutoring**

1. Study counseling is provided by the teachers of the Master. Active counseling can be provided, in particular to students enrolled in the first year of the Master, also to verify the results of the admission test as well as of the retaken of failed exams. Tutoring to students working to their thesis is remitted to the Supervisor. As for counseling aimed to employment, students can refer to the Job Placement office, pertaining to the School of Nature Science.

2. Teachers

PAOLA COSTELLI  
MICHELE DE BORTOLI  
GIOVANNA DI NARDO  
CARLO FERRETTI  
GIOVANNA GAMBAROTTA  
GIORGIO GRIBAUDO  
LUCA MUNARON  
FRANCESCA VALETTI

*People fixed by art. 1, comma 1, lett. B, DL n. 105/2003*

*People fixed by the University Rules*

CALABRO' Edoardo  
MAZZI Elena

## **ARTICLE 15**

### **Quality Insurance and Monitoring/Reassessment Committee**

1. The President of the Master is responsible for Quality Insurance and for both monitoring and reassessment procedures; she/he can appoint a Delegate as reference of quality insurance.
2. The Monitoring/Reassessment Committee is formed by at least four members, including the President of the Master, as coordinator, the Delegate for quality insurance, if any, teachers and

enrolled students. The latter are proposed by students' representatives, while the former must be teachers included in the Master Board. The Master Board itself will be in charge of appointing both teachers and students. The Committee should respect a paritetic composition; in this regard, students must be at least 25% of components, and in any case not less than 2. The Committee is in charge for three years. If, for every reason, one of the components leaves the Committee, she/he is substituted by the Master Board in the first useful meeting. The new component remains in charge until the Committee expires.

3. Main functions of the Committee are:

- debate among teachers and students;
- self-evaluation, annual Monitoring and cyclic Reassessment of the Master, including monitoring of the proposed corrective actions;
- preliminary investigation on: teaching activity efficiency (course data sheet included), curriculum, tutoring and other services directed to the students, Master parameters, student opinion (including its dissemination);
- help the President of the Master to prepare and update the SUA-CdS form;
- link with other didactic structures.

4. The Committee meets at the end of the didactic periods and when necessary, anyway not less than twice/year.

5. Components of the Didactic Paritetic Committee pertaining to the reference School/Department of the Master cannot be included in the Monitoring/Reassessment Committee.

## **ARTICLE 16**

### **Self-evaluation procedures**

1. Annual Monitoring and cyclic Reassessment are periodic and programmed self-evaluation procedures aimed at monitoring training activities and at verifying the learning objectives of the Master as well as the correspondence of such objectives with the results obtained. Both the annual Monitoring and the cyclic Reassessment identify the causes of critical points and propose corrective intervention, also indicating time, modality and people responsible for reaching the proposed target.

2. The President of the Master supervises the editing of both the annual Monitoring and the cyclic Reassessment, that are prepared and discussed with the Committee.

3. The President of the Master submits the annual Monitoring and the cyclic Reassessment to the Master Board for approval.

**ARTICLE 17**  
**Changes to the Regulation**

1. The present Regulation, proposed by the Master Board, is approved by the Boards of the Reference Departments. In case of disagreement between these latter, the approval is on behalf of the Academic Senate, after positive advice of the Management Board.
2. The Didactic Regulation of the Master, the Attachment 2 and the lists relative to arts. 13 (Attachment 3) and 14 are referred to the cohort of students firstly enrolled in the A.Y. 2016-2017.

**Attachment 1 – RAD**

**Attachment 2 – Study planning**

**Attachment 3 – Master Teacher's list**

<b>SSD Teacher</b>	<b>SSD Course</b>	<b>Name (DDMM 16/03/2007 ART. 1.9)</b>	<b>Characteristic with reference to the discipline taught</b>	<b>Reserach activity supporting didactics</b>
BIO/06	BIO/06	Perroteau Isabelle	Full professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/06	BIO/06	Bovolin Patrizia	Associate professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/06	BIO/06	De Marchis Silvia	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/06	BIO/06	Gambarotta Giovanna	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/09	BIO/09	Fiorio Pla Alessandra	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/09	BIO/09	Munaron Luca	Associate professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/10	BIO/10	Di Nardo Giovanna	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/10	BIO/10	Sadeghi Sheila	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/11	BIO/11	De Bortoli Michele	Full professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/11	BIO/11	Cutrupi Santina	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/14	BIO/14	Ferretti Carlo	Associate professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/14	BIO/14	Serpe Loredana	Temporary assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/16	BIO/16	Panzica Giancarlo	Full professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/16	BIO/16	Gotti Stefano	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
BIO/19	BIO/19	Gribaudo Giorgio	Full professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
FIS/02	FIS/02	Caselle Michele	Full professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
INF/01	INF/01	Botta Marco	Associate professor, didactic activity totally comprised into	<a href="#">Link to Teacher's page</a>

			own SSD	
INF/01	INF/01	Cordero Francesca	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
MED/03	MED/03	Giachino Claudia	Associate professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
MED/04	MED/04	Costelli Paola	Associate professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
MED/04	MED/04	Autelli Riccardo	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>
MED/04	MED/04	Penna Fabio	Assistant professor, didactic activity totally comprised into own SSD	<a href="#">Link to Teacher's page</a>