

**Faculty: Science and Technology**  
**Second level degree in Biological Sciences**  
**Class: 6M-Biology**

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## **1. Introduction**

The second level degree in Biological Sciences (LM-6 class Biology) aims to train graduates with a thorough understanding of the biological phenomena at cellular, molecular and nutritional level and it is designed to widen the cultural background of the biologist thereby promoting his/her entry in the working world. In this connection, to support the mobility and the successful integration of students and graduates in an international context, all the courses will be presented in English. The two-years second level degree in Biological Sciences, equivalent to 120 credits (CFU), offers the student the opportunity to choose between two degree programs (Molecular Diagnostics and Biotechnology, and Nutrition and Functional Food), designed to teach the students the most innovative technological approaches used in biomolecular, diagnostic and nutritional biology. To ensure a highly flexible and personalized curriculum, the degree in Biological Sciences includes 12 credit units for elective courses. Furthermore, 15 credit units will be devoted to practical laboratory courses to familiarize the student with the experimental methods and the principles of the scientific inquiry.

## **2. Qualifying Educational Objectives**

Graduates with the second level degree in Biological Science of the University of Camerino will:

- be able to understand the biological phenomena at both molecular and cellular level;
- have familiarity with the scientific method, develop scientific autonomy and apply the acquired knowledge and skills in different fields of the biological sciences and in particular in the biomolecular research field and in the biomedical, environmental and nutritional diagnostics.
- be able to judge and propose problem-solving strategies within the biological field;
- be able to illustrate, in both oral and written form, finalities and formalities of a biological experimentation;
- achieve command of mathematical, statistic and bioinformatics tools;
- be proficient in English within one's specific sphere of activity as well as for exchange of general information

To achieve the objectives indicated above, the Biological science degree program includes courses that should enable the student to:

- understand in-depth the structure and function of biological macromolecules and the chemical and biological mechanisms involved in their transformation;
- know the more innovative analytical methodologies and the related instrumentation;
- combine the theoretical preparation with hands-on experience through practical laboratory courses and an experimental thesis.

### **3. Employment areas for graduates and career opportunities**

Graduates of the second level degree in Biological Sciences have the opportunity to gain positions:

- in the biomolecular, biotechnological and bionutritional research field and in laboratories/institutions which perform biomedical, environmental and nutritional diagnostics.
- in public and private agencies, public administrations or industries which utilize bio-molecular approaches and biotechnology.
- in the fields of training, learning and dissemination of scientific culture, for example as teacher at secondary, post-secondary and technical schools, upon qualification as required by law.

Furthermore graduates of the second level degree in Biological Sciences are qualified to:

- formulate diets (personal and/or for community) and manage nutritional education programs;
- enter the third level degree programs (PhD or Specialized School)

The second level degree in Biological sciences affords admission to the state boards for membership in Section A of the Biologist's Professional Register.

### **4. Teaching organization**

The teaching organization of the graduate degree course in Biological Sciences can be accessed on-line by the service "didattica d'ateneo" available at <https://didattica.unicam.it>

#### 4.1 European Credit Transfer and Accumulation System (ECTS)

To earn the degree in Biological Sciences, the student must gain 120 credits, with 60 credits representing the average study workload in one academic year for a full-time student having a suitable starting preparation. According to the European Credit Transfer and Accumulation System (ECTS) one credit is equal to 25 working hours which could include lectures, practical laboratory courses and individual study required to reach the learning outcome. The ratio between the time spent for tutored activities and the time spent for individual studies should usually be about 1:3. One ECTS usually corresponds to a 8-hour frontal lecture or a 12-hour practical session. Moreover a credit should correspond to a 25-hour workload for a student preparing the experimental thesis. ECTS of training activities selected from other degree courses will be calculated according to university's degree course handbook.

#### 4.2 Assessment

All activities concerning ECTS must be assessed. The assessment is expressed by specific committees chaired by the staff in charge of the training activities. Courses can be either individual or integrated with a corresponding laboratory module. In case of complementary courses there will be one single exam. Course examinations are usually carried out in written and/or oral form. In case of integrated courses specific tests may be required in addition to the written and oral examination. Unless otherwise indicated, training activities are assessed by a grade expressed in 30<sup>ths</sup> with the possibility of the additional recognition of "lode" (with honors). To gain credits for internships a report on the performed activities countersigned by the teacher is required. In this case the assessment would be either pass (idoneo) or fail (non idoneo).

#### 4.3 Lecture and exam calendar

Teaching activities will start on 5<sup>th</sup> October 2009, and are divided into 2 semesters according to the following calendar:

I Semester Teaching Activity	5 <sup>th</sup> October 2009	to	29 <sup>th</sup> January 2010
I Exam session	1 <sup>st</sup> February 2010	to	26 <sup>th</sup> February 2010
II Semester Teaching activity	1 <sup>st</sup> March 2010	to	11 <sup>th</sup> June 2010
II Exam Session	4 <sup>th</sup> June 1 2010	to	30 <sup>th</sup> July 2010
III Exam Session	31 <sup>st</sup> August 2010	to	1 <sup>st</sup> October 2010

Course information related to time and place of lectures is available on-line at:  
<http://www.unicam.it/studenti>.

The calendar of exam sessions for each course is available at:  
<https://didattica.unicam.it>

Students who wants to take an exam must register on-line at :  
<https://didattica.unicam.it>

The exam program is the last teaching program carried out for the same course. Therefore the program carried out during the course will generally be valid for 12 months from the end of teaching activities.

## **5. Final exam and title acquisition**

The candidate must prepare a written dissertation in English concerning an original research project carried out in a public or private research laboratory. The number of credits assigned to this experimental thesis is 30. Upon completion of the required 120 course credits, the student is admitted to the final examination (esame di laurea) which consists in the oral presentation (in English) of the experimental work to a Committee (commissione di Laurea) constituted in accordance with the University rules. The presentation will be followed by a discussion to assess the real contribution of the student to the project and the preparation achieved at the end of the degree course. On the basis of the quality of the written dissertation, the presentation and the student's curriculum the Committee will assign the final grade, expressed in 110<sup>th</sup>. If the calculated grade is equal to or greater than 111, the committee may confer the label "lode" (with honors) with a unanimous vote.

## **6. Tutoring, vocational guidance and placement**

The Class Advisory Board will assign to each student a tutor to provide individual guidance throughout the student's university career. During the course of each semester, the tutoring coordinator will organize regular group meetings to discuss problems which may arise in any of the training activities. Students are encouraged to contact instructors by e-mail to request additional explanations on topics covered in class. Furthermore, the Class Advisory Board will provide vocational guidance to students in the third and final year of the program.

## **7. Mobility and Internazionalization**

The University of Camerino has underwritten agreements with foreign Universities and Institutions making possible for students to participate to exchange programs, such as Erasmus and Erasmus placement. In this regard, the second level degree in Biological Sciences has underwritten agreements with the following European Universities:

Country	University	Language	Activity
Portugal	Istituto Politécnico de Santarém	Portuguese/English	Courses/Thesis
United Kingdom	Westminster University (London)	English	Courses/thesis

Information related to the internationalization is available on-line at:  
[http://web.unicam.it/international/mobility/mob\\_rel\\_int\\_eng.asp](http://web.unicam.it/international/mobility/mob_rel_int_eng.asp)  
Further information can be obtained from the representative to the Internalization

## **8. Degree programs and curricula**

The “first level” degree in Biological Sciences offers two degree programs:

- Molecular Diagnostics and Biotechnology
- Nutrition and functional foods

### **8.1 Molecular diagnostics and Biotechnology**

The degree program in Molecular Diagnostics and Biotechnology is characterized by courses aimed at teaching:

- the molecular interactions and the chemical and biological mechanisms involved in the transformation processes of the biological components;
- structure, activity, interactions, genetics and differentiation processes of eukaryotic and prokaryotic cells
- medical, biotechnological, ecological and forensic applications of the molecular biology;
- set up of diagnostic protocols in the clinical, nutritional or environmental sphere;

The degree program in Molecular diagnostic and Biotechnology is divided in core courses (72 CFU) and elective courses (12 CFU). The remaining credits are devoted to: practical laboratory courses (6 CFU), the experimental thesis and the final exam (30 CFU).

Note that a student may submit for approval by the Class Advisory Board individual curriculum for the following academic year, proposing learning goals other than those proposed in the standard curriculum. The deadline for the

presentation of the individual curricula is the 15<sup>th</sup> of October of the academic year to which the curriculum refers.

The organization of the standard curriculum with the list of the disciplines and subjects, the division into modules, and the number of credits awarded is presented in the table below.

### Year I

<b>N</b>	<b>Course</b>	<b>CFU</b>	<b>Module</b>	<b>CFU per SSD</b>	<b>Typology (a,b,c,d,e,f,s)</b>	<b>Numerical grade or pass/fail</b>
1	Genomics and proteomics	13		3 BIO/18	b	grade
				4 BIO/06	b	
				3 BIO/10	b	
				3 INF/01	f	
2	High performance bio-analytical methods	6		BIO/10	b	grade
3	Epigenetics and Advanced molecular Biology	6		3 BIO/18	b	grade
				3 BIO/11		
4	Advanced molecular pathology and Molecular Oncology	7		4 MED/04	b	grade
				3BIO/13		
5	Clinical and Molecular Diagnostics	6		BIO/12	b	grade
6	Rotation Laboratory	6		NN	b	Pass/fail
7	Elective	12			d	grade

### Year II

<b>N</b>	<b>Course</b>	<b>CFU</b>	<b>Module</b>	<b>CFU per SSD</b>	<b>Typology (a,b,c,d,e,f,s)</b>	<b>Numerical grade or pass/fail</b>
8	Stem Cells, Medical Application and Animal Models	14	Stem Cells and Medical Application	8 BIO/17	c	grade
			Animal Models	6 BIO/13	b	
9	Molecular Parasitology	4		VET/06	c	grade
10	Molecular Ecology	4		BIO/07	b	grade
11	Molecular archaeological and forensic anthropology	6		BIO/08	b	grade
12	Microbial Pathogenesis and Biofilms	6		MED/07	b	grade
	Experimental Thesis	30			e	grade

a) basic course; b) core course; c) supplementary course; d) elective course; e) for the final exam and for knowledge of a foreign language; f) other (additional language skills, computer skills, internship/work experience stage etc.)

## **Elective courses**

<b>Course</b>	<b>CFU</b>
Epigenetics	4
Advanced Food Pathology	8
Applied Nutrition I	9
Applied Nutrition II	9
Blood Parameters and Nutritional Conditions	6
Endocrinology and Metabolism	6
Epidemiology of Nutrition-Related Pathologies	4
Functional Food	7

### **8.2 Nutrition and Functional foods**

The degree program in Nutrition and Functional foods is characterized by courses aimed at teaching:

- properties of nutrients and non-nutrients presents in foods and their possible modifications produced by the transformation processes;
- biochemical and physiological mechanisms of the digestion and uptake and of the metabolism of nutrients;
- functionality and health benefits of foods
- effects of malnutrition (poor nutrition or over nutrition)
- Diet programs both personal and for communities.
- Interplay between endocrine system and nutritional state.

The degree program in Molecular diagnostic and Biotechnology is divided in core courses (72 CFU) and elective courses (12 CFU). The remaining credits are devoted to: practical laboratory courses (6 CFU), the experimental thesis and the final exam (30 CFU).

Note that a student may submit for approval by the Class Advisory Board individual curriculum for the following academic year, proposing learning goals

other than those proposed in the standard curriculum. The deadline for the presentation of the individual curricula is the 15th of October of the academic year to which the curriculum refers.

The organization of the standard curriculum with the list of the disciplines and subjects, the division into modules, and the number of credits awarded is presented in the table below.

### Year I

<b>N</b>	<b>Course</b>	<b>CFU</b>	<b>Module</b>	<b>CFU per SSD</b>	<b>Typology (a,b,c,d,e,f,s)</b>	<b>Numerical grade or pass/fail</b>
1	Genomics and Proteomics	13		3 BIO/18	c	grade
				3 INF/01	f	
				4 BIO/10	b	
				3 BIO/06	b	
2	High Performance Bio-Analytical Methods	6		BIO/10	b	grade
3	Advanced Food Pathology	8		MED/04	b	grade
4	Epigenetics	4		BIO/18	b	grade
5	Applied Nutrition I	9		3 BIO/10	b	grade
				6 AGR/18	c	
6	Rotation Laboratory	6		3BIO/06	b	Pass/fail
				3 BIO/09		
7	Elective	12		NN	d	grade

### Year II

<b>N</b>	<b>Course</b>	<b>CFU</b>	<b>Module</b>	<b>CFU per SSD</b>	<b>Typology (a,b,c,d,e,f,s)</b>	<b>Numerical grade or pass/fail</b>
8	Functional Food	7	mod1	4 BIO/19	b	grade
			mod2	3 CHIM/10		
9	Endocrinology and Metabolism	6		BIO/06	b	grade
10	Applied Nutrition II	9		6 MED/49	b	grade
				3 BIO/06		
11	Epidemiology of Nutrition-Related Pathologies	4		BIO/18	c	grade
12	Blood Parameters and Nutritional Conditions	6		BIO/12	b	grade
	Experimental Thesis	30			e	

a) basic course; b) core course; c) supplementary course; d) elective course; e) for the final exam and for knowledge of a foreign language; f) other (additional language skills, computer skills, internship/work experience stage etc.)

## **Elective courses**

<b>Course</b>	<b>CFU</b>
Epigenetics and advanced molecular biology	6
Biology	6
Clinical and molecular diagnostics	6
Advanced molecular pathology and molecular oncology	7
Infectious diseases and biofilm	6
Molecular archeological and forensic anthropology	6
Molecular ecology	4
Molecular parasitology	4
Stem cells, medical application and animal models	14

## **9. Entry Requirements**

To access to the second level degree in Biological Sciences (Biological Sciences) is necessary to be holding a first level degree or three-year university or other educational qualifications obtained abroad and judged suitable. The Class Advisory Board will decide the curriculum requirements for the admission to the second level degree in Biological Sciences and the criteria for the verification of the educational level of the student.

Each student will be evaluated through an interview. The criteria, and the interviews schedule will be published on the University website.

Since all the degree programs are in English, the students are expected to have at least a B1 (PET) level of English language ability, which will be evaluated through a test organized by the University of Cambridge. Students who do not meet our English language requirements, can bring their English up to the level needed by taking our English remedial courses.