# Facoltà: **Scienze e Tecnologie - Farmacia**
# Corso di Laurea in **Biotecnologie**

First level degree program in
Biotechnology

Class 1
Biotechnology

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## Introduction

The recent university reform was put into effect with the academic year 2002-2003. This reform splits the basic university degree into two levels, leaving the masters (diploma di specializzazione) and doctorate (dottorato di ricerca), degrees as they were. According to the Ministerial Decree of November 3, 1999, n. 509, Italian Universities now offer a first level title (laurea magistrale), which can be obtained after a three year course, and a second level title, called a specialistic degree ('laurea magistrale', not to be confused with masters, 'diploma di specializzazione') of two years, which can be obtained after the three-year, first level degree (laurea magistrale). The first level degree program ('laurea magistrale' in Biotechnology, active in the Pharmaceutical and Sciences Faculty, is articulated in two years of general studies for all enrolled, followed by a third year in which it is possible to choose between the following professional concentrations:
Pharmaceutical: trains students in the technical skills needed for production, analysis, and quality control of pharmaceutical products, and in general, of bioactive molecules obtained through biotechnological processes.
Microbic: provides technical skills needed to produce biomolecules and/or prokaryotic and eukaryotic microorganisms that are genetically modified and endowed with new functions and behaviours, which serve in synthesising useful products for industry and the environment.
To enrol in this degree program, students need a valid high school diploma.
Students who transfer from other degree programs (diploma, laurea magistrale or old five year degree) at the University of Camerino, or other universities, can enrol in the Biotechnology course.
To promote the enrolment of students from foreign countries, as well as to familiarise italian students with the english language (nowdays essential in scientific research) the lessons of the course will be given in English.

## Course objectives

The Biotechnology degree educates students professionally, providing:

- a solid basis in chemistry, physics, mathematics, statistics and computer sciences;
- essential knowledge of the systems and structures of biological systems;
- skills needed in producing biomolecules and genetically modified microorganisms for applications in industry and the environment (microbic concentration), and for the production, analysis and quality control of pharmaceutical products, and in general, of bioactive molecules obtained through biotechnological processes (pharmaceutical concentration).

In addition, students will gain competency in using computerized instruments for biotechnology and will broaden their knowledge of related economic and juridical issues, as well as deepen their skills in business management, public relations, and communication.

Professional applications
Biotechnologists can work in the following fields:

- Agriculture and Foods
  The food industry, that of animal feeds, and that of bio-fertilizers. Genetics laboratories, those dedicated to revelation of genetically modified organisms in foods and plants.
- Chemical
  Chemical and Biotechnological Industries. Research Centers for the development of diagnostic products.
- Pharmaceutical
  Cosmetic, pharmaceutical, and biotechnological industries.
- Protection of the enviroment
  Public and private laboratories operating in the environmental field and that of waste disposal.
- Public and private research centers and institutions
  Universities, the national research center, Regional Institutes for environmental protection, institutes for the prevention of animal diseases, observatories, agencies for phyto-health assessment.

Requirements
Admission to studies for the Degree in Pharmacy does not require specialized preparation; the knowledge needed to pass the Secondary School final exam is sufficient. However, all students who enrol in the Pharmacy Course Degree must pass an oral exam aimed at orienting students to integration courses that may be necessary to overcome any lack of academic preparation.

The integration courses, for first year students only, are planned before the beginning of the lessons. The course timetable will be printed on flyers available at the Faculty Secretariat and at the Student Secretariat.

Schedule of exams
The three-year Biotechnology degree demands 180 university format credits (UFC), which means passing 27 exams (Pharmaceutical Curriculum) or 29 exams (Microbic Curriculum); in addition, there are 9 CFU for optional formational activities and 7 CFU for an internship ('stage'). An original thesis is not required, but a short research paper ('tesina') is expected. The research paper can be prepared during the internship with a business tutor, or with the guidance of a university teacher.

The student should choose the concentration (microbic or pharmaceutical) by September 30th of the second year.
The courses leading to the degree in biotechnology comprise theoretical and practical exercises, and seminars. There three academic periods of 8-10 weeks each, with intervals of 3-4 weeks at least.

Year I

| *Semester* | *ECTS* | *Subjects to be studied* | *Kind of merit-rating* |
|---|---|---|---|
| 1° | 10 | Mathematics and Statistics | Examination |
| 1° | 8 | General Biology and Microbiology | Examination |
| 1° | 8 | General and Inorganic Chemistry | Examination |
| 2° | 10 | Physics and application to Biology | Examination |
| 2° | 6 | Organic Chemistry | Examination |
| 2° | 5 | Introduction to Computer Science | Examination |

| | | | |
|---|---|---|---|
| 2° | 5 | General Genetics | Examination |
| 1° and 2° | | 9 English | Examination |

Year II

| *Semester* | *ECTS* | *Subjects to be studied* | *Kind of merit-rating* |
|---|---|---|---|
| 1° | 8 | Chemical Biology | Examination |
| 1° | 6 | Work Physiology | Examination |
| 1° | 14 | Molecular Biology Molecular Genetics and Genetic Engineering | Examination |
| 1° | 6 | European Union Low | Examination |
| 2° | 6 | Applied Microbiology | Examination |
| 2° | 7 | Cell Biology and Cellular Biotechnology | Examination |
| 2° | 6 | Immunology | Examination |
| 2° | 5 | Applied Physical Chemistry | Examination |

Year III (Pharmaceutical Curriculum)

| *Didactic Period* | *ECTS* | *Subjects to be studied* | *Kind of merit-rating* |
|---|---|---|---|
| 1° | 8 | Pharmacology | Examination |
| 1° | 4 | Physiology | Examination |
| 1° | 8 | Pharmaceutical Thecnology | Examination |
| 1° | 6 | Economics and industrial Low | Examination |
| 2° | 6 | Pharmaceutical Technology | Examination |
| 2° | 8 | Drug Analysis | Examination |
| 2° | 4 | Fermentation Chemistry and Biotechnology | Examination |

Year III (Microbial Curriculum)

| Semester | ECTS | Subjects *to be studied* | Kind of *merit-rating* |
|---|---|---|---|
| 1° | 6 | Clinical Biochemistry and Molecular Biology | Examination |
| 1° | 4 | Fundamentals of Medicinal Chemistry | Examination |
| 1° | 6 | Economy and industrial Low | Examination |
| 1° | 11 | Genetics of Microrganisms and Microbial Biotechnology | Examination |
| 2° | 7 | Food Chemistry and Analytical Chemistry | Examination |
| 2° | 6 | Microbiology and Clinical Microbiology | Examination |
| 2° | 4 | Fermentation Chemistry and Biotechnology | Examination |

The internship ('stage') (7 CFU), which can be done after having obtained 120 CFUs, entails at least 3 months at a research laboratory; the latter may also be one outside the University of Camerino, if it is listed among those chosen by the Academic Council, and meets the approval of the person responsible.

Course regulations
The Faculty Council defines course curricula to ensure propaedeuticity, sequencing exams according to the activities and studied required. If teaching exigencies so require, it may organize intensive courses in cycles different from regular academic periods and with a final examination related to individual disciplines taught during the academic year.

The students who are on schedule in attending courses may take the final test for the course attended immediately at the end of the didactic period of the course, or they may take the exam subsequently, during the exams sessions established in the Faculty exam calendar.

Students cannot do examinations listed in column A before having passed the exam listed in column B.

| A | B |
|---|---|
| Organic Chemistry | Analytical Chemistry |
| Pharmaceutical Analysis | |
| Biological Chemistry | General and Inorganic Chemistry |

The optional activities chosen by the student are not tested with a conventional exam. The student's level will be ascertained during the year through tests.

Calendar of lessons and exams
Lessons: from the beginning of October to the end of June, organized in two period, with intervals of 12 weeks.

Exams: during the intervals between lesson periods except January and August.

Regulations
Students may find further information on the Didactic Regulations of Class 1 (Biotechnology), on the University web site (address http://web.unicam.it/unicam/didattica/farmaFrame.html), together with other documents on course content and other information related to the degree in Biotechnology.

Biotechnology Specialized Degree (second level title, or 'laurea magistrale').
All 180 credits of the first level degree ('laurea magistrale') are accepted for enrolment in the specialized degrees of class 9/S Medical, Veterinarian and Pharmaceutical Biotechnologies (the specialized degree in Pharmaceutical Biotechnologies).
Most of the credits are also recognized for the specialized degree of class 6/S in Biology (the specialized degree in Biomolecular and Biofunctional Sciences).

For further information, please contact:

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