



DIDACTIC REGULATIONS OF THE DEGREE PROGRAM

BIOLOGICAL SCIENCES

CLASS LM-6

School: Polytechnic of Basic Sciences

Department: Biology

Regulations in force since the academic year 24-25

ACRONYMS

| | | |
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| CCD | [Commissione di Coordinamento Didattico] | Didactic Coordination Commission |
| CdS | [Corso/i di Studio] | Degree Program |
| CPDS | [Commissione Paritetica Docenti-Studenti] | Joint Teachers-Students Committee |
| OFA | [Obblighi Formativi Aggiuntivi] | Additional Training Obligations |
| SUA-CdS | [Scheda Unica Annuale del Corso di Studio] | Annual single form of the Degree Program |
| RDA | [Regolamento Didattico di Ateneo] | University Didactic Regulations |

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Art. 1

Object

1. These Didactic Regulations govern the organisational aspects of the Master's degree in "Biological Sciences" (class LM-6 - Biology). The Master's degree in Biological Sciences is held in the Department of Biology, and is a course taught in Italian.
2. The Degree course is governed by the Didactic Coordination Commission (CCD), pursuant to Art. 4 of the RDA.
3. The Didactic Regulations is issued in compliance with the relevant legislation in force, the Statute of the University of Naples Federico II, and the RDA.

Art. 2

Training objectives

In compliance with the qualifying training objectives of the LM-6-degree class, the Master's degree course in Biological Sciences is aimed at training figures of broad cultural depth and high professional profile whose activity may concern:

- activities to promote and develop scientific and technological innovation, as well as management and design of technologies.
- professional and project activities in fields related to biological disciplines, in public and private research institutes, in the sectors of industry, healthcare and public administration, with particular regard to integrated knowledge and the protection of animal and plant organisms, microorganisms, biodiversity, the environment; to the dissemination and scientific dissemination of the relevant knowledge; to the regulated use and increase of biotic resources; to clinical, biological and microbiological analysis laboratories, biological and quality control of products of biological origin and production chains; to the design, construction management and testing of systems relating to biological aspects (e.g. purification plants); to molecular-biological applications in the health, environmental and cultural heritage fields. The master's degree in Biological Sciences is divided into curricula dedicated to biological diagnostics, biosafety, environmental biology and neuroscience; in each curriculum the training path includes a block of characterizing courses, which ensure a solid preparation in basic biology, and a series of similar and integrative courses, which guarantee the necessary multidisciplinary insights and individual training paths.

The master's degree in Biological Sciences has as its qualifying educational objective the preparation of graduates who will have:

- a) a solid and integrated cultural preparation in basic biology and in various sectors of applied biology.
- b) high scientific and operational preparation in the disciplines that characterize the class.
- c) an in-depth knowledge of biological problems, instrumental methodologies, analytical tools and data acquisition and analysis techniques in the main fields of biology.
- d) ability to learn and apply innovations in the technical and experimental fields.
- e) ability to use the English language fluently, in written and oral form, as well as Italian, also with reference to disciplinary lexicons.
- f) ability to work with great autonomy, even taking on managerial roles that involve complete responsibility for projects, structures, and personnel.

For the purposes indicated, all curricular paths include training activities aimed at acquiring in-depth knowledge of basic biology and its applications, with particular attention to theoretical advances and technological applications.

Furthermore, the course of study will allow in-depth preparation in different professional fields, thanks to the division into curricula, which are organized didactically to give each individual in-depth knowledge and professional skills in the fields of: biological diagnostics, biosafety, environmental biology, and neuroscience.

To achieve these curricular objectives, the following will be further explored:

- i) the structural, functional and molecular aspects applied to biodiagnostics;
- ii) the study of experimental methods, including advanced and molecular ones in the field of biosafety.
- iii) structural, functional, and ecosystem-based aspects in the assessment of environmental quality and biodiversity conservation.
- iv) the study of structural, functional, and molecular aspects of neuroscience.

An important part of the training course will be the carrying out of laboratory activities, aimed at the preparation of an experimental thesis, and aimed at the application and deepening of specific knowledge acquired which will allow you to learn the correct ways in which to approach and resolve the problems that the biologist will find himself faced in the various relevant work fields.

Thanks to carrying out an internship in a biological research laboratory, or an analytical or monitoring laboratory, or a production company in the biological, biochemical, pharmaceutical or biotechnological field, or a healthcare facility, or a territorial body active in environmental matters or conservation practices, a park or a nature reserve, or a structure engaged in voluntary activities, or alternatively through the acquisition of further knowledge useful for entering the world of work, the student acquires knowledge of the complex world of work in the organic sector and consolidates one's perception and awareness of the relationship between university preparation and professional activities.

Graduates with a master's degree in Biological Sciences will acquire at least one European Union language in addition to Italian and will possess adequate knowledge for the use of IT tools, necessary in the specific field of competence and for the exchange of general information.

Art. 3

Professional profile and work opportunities

The Master's Degree course aims to train the professional figure of the Biologist.

Based on Presidential Decree 328/01, graduates can take the state exam to qualify to practice the profession of Biologist and consequently obtain registration in the National Order of Biologists (section B). Graduates in Biological Sciences will be able to carry out technical-operational tasks and independent professional and support activities within the limits indicated by the law establishing the biologist system (Law 396/67 of 5 May 1967). The course prepares you for the profession of biologist, as regulated by Law 24 May 1967, n. 396 and by the Presidential Decree 5 June 2001, n. 328, after passing the State Exam.

The object of the professional activity consists in covering roles of high responsibility to be carried out independently in:

- control of activity, sterility, harmlessness of insecticides, medicines, enzymes, serums, vaccines, radioisotopes; biological analyses in the healthcare area, including serological, immunological, pregnancy, metabolic and genetic analyses.
- analysis and biological controls of water (including drinkable and mineral) and evaluation of environmental parameters and that of the integrity of natural ecosystems.
- identification of pathogens affecting living beings, including humans, and those harmful to the environment, foodstuffs, cultural heritage, and the indication of the relevant means of control.
- identification and control of goods of biological origin.
- environmental impact assessment, relating to biological-ecological aspects.

Other possible professional opportunities for graduates are in the field of medical-scientific information and, after continuing their studies, in the field of teaching in middle and high schools.

Skills associated with the function:

The master's graduate in Biological Sciences possesses solid and integrated skills in basic biology and in various sectors of applied biology, as well as an in-depth knowledge of biological problems, instrumental methodologies, analytical tools and data acquisition and analysis techniques in all fields of biology, with particular attention to pathophysiological, biodiagnostic, environmental, biosafety and neuroscience investigations.

This involves:

- in-depth conceptual and operational knowledge of the methodologies used in biochemistry, molecular biology, genetics, microbiology, including the manipulation and analysis of biological macromolecules, microorganisms, cells and complex organisms for pathophysiological, biodiagnostic, environmental, biosafety and neuroscience.
- knowledge of at least one European Union language, in addition to Italian, in the specific area of expertise.
- adequate skills and tools for communication and information management.
- ability to work in a group environment, independently and to have the ability to integrate into work environments.
- possession of basic cognitive tools for continuously updating one's knowledge.

Employment opportunities:

Graduates with a master's degree in Biological Sciences will be able to hold roles of high responsibility as a freelancer (subject to registration with the National Order of Biologists) or as an employee, also taking on managerial roles, in companies or organizations in the following sectors:

- Production and technological activities in laboratories for clinical, biological, and microbiological analysis, control, and quality of products of biological origin.
- Activities for the promotion and development of scientific and technological innovation.
- Activities relevant to biological applications in the industrial, healthcare, food, environmental and cultural heritage fields.
- Typing laboratories, also by molecular markers, of individuals and animal, plant, and microbial species for food, legal, health, pharmaceutical and environmental purposes.

- Public and private scientific research and service bodies in the bio-diagnostic, biosafety, environmental and neuroscience fields.
- Creation and management of databases in the biological field.
- Biotechnology laboratories, biomedical and biotechnological industries.
- Institutes and laboratories for the evaluation of the biotic impact on the conservation of cultural heritage.
- Pharmaceutical companies as a pharmaceutical medical representative.
- Field of training and scientific dissemination.

Art. 4

Admission requirements and knowledge required for access to the Degree Program¹

Students who intend to enrol in the master's degree course in Biological Sciences (class LM-6) must be in possession of a three-year university degree or diploma or other qualification obtained abroad, recognized as suitable according to current legislation.

For direct access to the master's degree course in Biological Sciences, the student must demonstrate that they have acquired the knowledge required for the three-year degree of class L-13 (i.e. class 12 pursuant to Ministerial Decree 509).

Students coming from other degree classes must demonstrate knowledge of the BIO/, CHIM/, FIS/, MAT/ SSDs. Possession of curricular requirements is determined by having acquired a total of no less than 90 CFU in the scientific-disciplinary sectors of the BIO area as well as in the MAT/01-MAT/09, FIS/01-FIS/08 and CHIM/01-CHIM sectors /12 of which:

- at least 6 credits in courses in the scientific disciplinary sectors from MAT/01 to MAT/09
- at least 6 credits in courses in the scientific disciplinary sectors from FIS/01-FIS/08
- at least 12 credits in courses in the scientific disciplinary sectors CHIM/01, CHIM/03, CHIM/06, CHIM/12
- at least 20 credits in courses in the sectors BIO/01, BIO/02, BIO/03, BIO/05, BIO/06, BIO/07, BIO/16, BIO/17)
- at least 6 credits in courses in the BIO/09, MED/04, MED/42 sectors
- at least 20 credits in courses in the sectors BIO/04, BIO/10, BIO/11, BIO/12, BIO/13, BIO/18, BIO/19, AGR/07, MED/03, MED/07.

Students must also meet the requirements of adequate personal preparation. The methods for verifying personal preparation for access to the master's degree course in Biological Sciences are reported in the teaching regulations of the study course and published annually on the WEB site of the Department of Biology.

¹ Artt. 7, 13, 14 of the University Didactic Regulations.

Art. 5

Procedures for access to the Degree Program

The CCD of the Degree Program normally regulates the admission criteria and any scheduling of enrolments, except in the case subject to different provisions of law².

1. Verification of personal preparation is always mandatory, and only students who meet the curricular requirements can access it.
2. The methods of verifying personal preparation for access to the master's degree course in Biological Sciences are defined year by year by the CCD and published on the WEB site of the Department of Biology.

Art. 6

Teaching activities and university training credit (Teaching activities and CFU)

Each training activity, prescribed by the Degree course detail sheet, is measured in CFU. Each CFU corresponds to 25 hours of overall training commitment³ per student and includes the hours of teaching activities specified in the curriculum as well as the hours reserved for personal study or other individual training activities.

For the Degree Program covered by this Didactic Regulations, the hours of teaching specified in the curriculum for each CFU, established in relation to the type of training activity, are as follows⁴:

- Lecture or guided teaching exercises: 8 hours per CFU.
- Seminar: 8 hours per CFU;
- Laboratory or field activities: 8 hours per CFU;

For Internship and Thesis activities, each credit corresponds to 25 hours of overall training commitment⁵.

The CFU corresponding to each training activity are acquired by the student by satisfying the profit verification methods (exam, suitability) indicated in the Schedule relating to the teaching/activity attached to these Regulations.

Art. 7

Description of teaching methods

The didactic activity is carried out in conventional modality.

If necessary, the CCD decides which courses also include teaching activities offered online, according to Ministerial Decree 289 of 25 March 2021 (general guidelines for the three-year planning of universities 2021-2023), in Annex 4, letter A.

² National programmed access is regulated by L. 264/1999 and subsequent amendments and supplements.

³ According to Art. 5, c. 1 of Italian Ministerial Decree No 270/2004, "25 hours of total commitment per student correspond to university training credits; a ministerial decree may justifiably determine variations above or below the aforementioned hours for individual classes, by a limit of 20 per cent".

⁴ The number of hours considers the instructions in Art. 6, c. 5 of the RDA: "of the total 25 hours, for each CFU, are reserved: a) 5 to 10 hours for lectures or guided teaching exercises; b) 5 to 10 hours for seminars; c) 8 to 12 hours for laboratory activities or fieldwork, except in the case of training activities with a high experimental or practical content, and subject to different legal provisions or different determinations by DD.MM."

⁵ For Internship activities (Inter-ministerial Decree 142/1998), subject to further specific provisions, the number of working hours equal to 1 CFU may not be less than 25.

Some courses may also take place in seminar form and/or involve classroom exercises, language, and computer laboratories.

Detailed information on how each course is conducted can be found in the course sheets.

Art. 8

Testing of training activities⁶

1. The CCD, within the prescribed regulatory limits⁷, establishes the number of examinations and other means of assessment that determine the acquisition of credits. Examinations are individual and may consist of written, oral, practical, graphical tests, term papers, interviews, or a combination of these modes.
2. The examination procedures published in the course sheets and the examination schedule will be made known to students before the start of classes on the Department's website.⁸
3. Examinations are held subject to booking, which is made electronically. In case the student is unable to book an exam for reasons that the President of the Board considers justifiable, the student may still be admitted to the examination, following those students already booked.
4. Before examination, the President of the Board of Examiners verifies the identity of the student, who must present a valid photo ID.
5. Examinations are marked out of 30. Examinations involving an assessment out of 30 shall be passed with a minimum mark of 18; a mark of 30 may be accompanied by honours by unanimous vote of the Board. Examinations are marked out of 30 or with a simple pass mark. Assessment following tests other than examinations are marked out with a simple pass mark.
6. Oral exams are open to the public. If written tests are scheduled, the candidate has the right to see his/her paper(s) after correction.
7. Examination Boards are governed by the University Didactic Regulations⁹.

Art. 9

Degree Program structure and Study Plan

⁶ Article 22 of the University Didactic Regulations.

⁷ Pursuant to the DD.MM. 16.3.2007 in each Degree Programs the examinations or profit tests envisaged may not be more than 20 (Bachelor's Degrees; Art. 4. c. 2), 12 (Master's Degrees; Art. 4, c. 2), 30 (five-year single-cycle Degrees) or 36 (six-year single-cycle Degrees; Art. 4, c. 3). Pursuant to the RDA, Art. 13, c. 4, "the assessments that constitute an eligibility evaluation for activities referred to in Art. 10, c. 5, letters c), d), and e) of Ministerial Decree no. 270/2004, including the final examination for obtaining the degree, are excluded from the calculation." For Master's Degree Program and single-cycle Master's Degree Program, however, pursuant to the RDA, Art. 14, c. 7, "the assessments that constitute a progress evaluation for activities referred to in Art.10, c. 5, letters d) and e) of Ministerial Decree no. 270/2004 are excluded from the exam count; the final examination for obtaining the Master's Degree and single-cycle Master's Degree is included in the maximum number of exams".

⁸ Reference is made to Art. 22, c. 8, of the University Teaching Regulations, which states that "the Department or School ensures that the dates for progress assessments are published on the portal with reasonable advance notice, which normally cannot be less than 60 days before the start of each academic period, and that an adequate period of time is provided for exam registration, which is generally mandatory."

⁹ Reference is made to Art. 22, paragraph 4 of the RDA according to which "Examination Boards and other assessments committees are appointed by the Director of the Department or by the President of the School when provided for in the School's Regulations. This function may be delegated to the CCD Coordinator. The Commissions comprise of the President and, if necessary, other professors or experts in the subject. In the case of active courses, the President is the course instructor, and in such cases, the Board can validly make decisions even in the presence of the President alone. In other cases, the President is a professor identified at the time of the Board's appointment. In the comprehensive evaluation of the overall performance at the conclusion of an integrated course, the professors in charge of the coordinated modules participate, and the President is appointed when the Commission is appointed."

1. The legal duration of the Degree Program is 2 years. The student must acquire 120 CFU¹⁰, attributable to the following Types of Training Activities (TAF):

- B) characterising,
- C) related or complementary,
- D) at the student's choice¹¹,
- E) for the final exam,
- F) further training activities.

2. The degree is awarded after having acquired 120 CFU by passing examinations, not exceeding 12 including the final exam, and the performance of other training activities.

Unless otherwise provided for in the legal framework of University studies, examinations taken as part of basic, characterising, and related or supplementary activities, as well as activities chosen autonomously by the student (TAF D) are taken into consideration for counting purposes. Examinations or assessments relating to activities independently chosen by the student may be considered in the overall calculation corresponding to one unit¹². Tests constituting an assessment of suitability for the activities referred to in Article 10, paragraph 5, letters d) and e) of Ministerial Decree 270/2004¹³ are excluded from the count. Integrated Courses comprising of two or more modules are subject to a single examination.

3. To acquire the CFU relating to independent choice activities, as well as training activities that are not teaching activities, the student is free to choose among all the Course offered by the University, if they are consistent with the training project. This consistency is assessed by the Didactic Coordination Commission. Also, for the acquisition of the CFU relating to autonomous choice activities the "passing the exam or other form of profit verification" is required (Art. 5, c. 4 of Ministerial Decree 270/2004).

The student can also include internship credits in excess of those foreseen by the regulation among the credits of his choice, subject to approval by the CCD. It is possible to take elective credits even in years other than the one foreseen, as long as they do not exceed, in total, those required for the entire degree course.

4. The study plan summarises the structure of the Degree Program, listing the envisaged teachings broken down by course year and, in case, by curriculum. At the end, the propedeuticities envisaged by the Degree Program are listed. The study plan offered to students, with an

¹⁰ The total number of CFU for the acquisition of the relevant degree must be understood as follows: six-year single-cycle Degree, 360 CFU; five-year single-cycle Degree, 300 CFU; Bachelor's Degree, 180 CFU; Master's Degree, 120 CFU.

¹¹ Corresponding to at least 12 ECTS for Bachelor's Degrees and at least 8 CFU for Master's Degrees (Art. 4, c. 3 of Ministerial Decree 16.3.2007).

¹² Pursuant to the D.M. 386/2007.

¹³ Art. 10, c. 5 of Ministerial Decree. 270/2004: "In addition to the qualifying training activities, as provided for in paragraphs 1, 2 and 3, Degree Programs shall provide for: a) training activities autonomously chosen by the student as long as they are consistent with the training project [TAF D]; b) training activities in one or more disciplinary fields related or complementary to the basic and characterising ones, also with regard to context cultures and interdisciplinary training [TAF C]; c) training activities related to the preparation of the final exam for the achievement of the degree and, with reference to the degree, to the verification of the knowledge of at least one foreign language in addition to Italian [TAF E]; d) training activities, not envisaged in the previous points, aimed at acquiring additional language knowledge, as well as computer and telematic skills, relational skills, or in any case useful for integration in the world of work, as well as training activities aimed at facilitating professional choices, through direct knowledge of the job sector to which the qualification may give access, including, in particular, training and guidance programs referred to in Decree no. 142 of 25 March 1998 of the Ministry of Labour [TAF F]; e) in the hypothesis referred to in Article 3, paragraph 5, training activities relating to internships and apprenticeships with companies, public administrations, public or private entities including those of the third sector, professional orders and colleges, on the basis of appropriate agreements".

indication of the scientific-disciplinary sectors and the area to which they belong, of the credits, of the type of educational activity, is set out in Annex 1 to this Didactic Regulations.

5. Pursuant to the Art. 11, paragraph 4-bis, of Ministerial Decree 270/2004, it is possible to obtain the Degree according to an individual study plan that also includes educational activities different from those specified in the Didactic Regulations, if they are consistent with Degree course detail sheet of the academic year of enrollment. The individual study plan is approved by CCD.

Art. 10

Attendance requirements¹⁴

1. In general, attendance of lectures is strongly recommended but not compulsory.
2. If the lecturer envisages a different syllabus modulation for attending and non-attending students, this is indicated in the individual Course detail published on the Master's degree course web page and on the teacher's UniNA website.
3. Attendance at seminar activities that award training credits is compulsory. The relative modalities for the attribution of CFU are the responsibility of the CCD.

Art. 11

Prerequisites and prior knowledge

1. The list of incoming and outgoing propedeuticities (necessary to sit a particular examination) can be found at the end of Annex 1 and in the teaching/activity course sheet (Annex 2).
2. Any prior knowledge deemed necessary is indicated in the individual Teaching Schedule published on the course webpage and on the teacher's UniNA website.

Art. 12

Degree Program Calendar

The Degree Program calendar can be found on the Department's website well in advance of the start of the activities (Art. 21, c. 5 of the RDA).

Art. 13

Criteria for the recognition of credits earned in other Degree Programs in the same Class¹⁵

For students coming from Degree Programs of the same class, the Didactic Coordination Commission ensures the full recognition of CFU, when associated with activities that are culturally compatible with the training Degree Program, acquired by the student at the originating Degree Program, according to the criteria outlined in Article 14 below. Failure to recognise credits must be adequately justified. It remains understood that the portion of university training credits relating to the same scientific-disciplinary sector directly recognized to the student cannot be less than 50% of those already obtained. If the course of origin is carried out in distance mode, the minimum quota

¹⁴ Art. 22, c. 10 of the University Didactic Regulations.

¹⁵ Art. 19 of the University Didactic Regulations.

of 50% is recognized only if the course of origin is accredited pursuant to the ministerial regulation referred to in article 2, paragraph 148, of the legislative decree 3 October 2006, n. 262, converted by law 24 November 2006, n. 286.

Article 14

Criteria for the recognition of credits acquired in Degree Programs of different classes, in university or university-level Degree Programs, through single courses, at online Universities and in international Degree Programs¹⁶; criteria for the recognition of credits acquired in extra-curricular activities

1. Regarding the criteria for the recognition of CFU acquired in Degree Programs of different Classes, in university or university-level Degree Programs, through single courses, at online Universities and in International Degree Programs, the credits acquired are recognised by the CCD on the basis of the following criteria:

- analysis of the activities carried out;
- evaluation of the congruity of the disciplinary scientific sectors and of the contents of the training activities in which the student has earned credits with the specific training objectives of the Degree Program and of the individual training activities to be recognised.

Recognition is carried out up to the number of credits envisaged by the didactic system of the Degree Program. Failure to recognise credits must be adequately justified. Pursuant to the Art. 5, c. 5-bis, of Ministerial Decree 270/2004, the acquisition of CFU from other Italian universities is also possible, based on agreements established between the concerned institutions in accordance with the current regulations¹⁷.

2. Any recognition of CFU relating to examinations passed as single courses may take place within the limit of 36 CFU, upon request of the interested party and following the approval of the CCD. Recognition may not contribute to the reduction of the legal duration of the Degree Program, as determined by Art. 8, c. 2 of Ministerial Decree 270/2004, except for students who enrol while already in possession of a degree of the same level¹⁸.

1. With regard to the criteria for the recognition of CFU acquired in extra-curricular activities, within the limit of 12 CFU the following activities may be recognised:

- Professional knowledges, skills, and certified skills, taking into account the congruence of the activity carried out and/or of the certified skill with the aims and objectives of the Degree Program as well as the hourly commitment of the duration of the activity.
- Knowledges and skills acquired in post-secondary-level training activities, which the University contributed to develop and implement.

Art. 15

Criteria for enrolment in individual teaching courses

Enrolment in individual teaching courses, provided for by the University Didactic Regulations¹⁹, is governed by the "University Regulations for enrolment in individual teaching courses activated as part of the Degree Program"²⁰

¹⁶ Art. 19 of the University Didactic Regulations.

¹⁷ Art. 6, c. 9 of the University Didactic Regulations.

¹⁸ R.D. No. 3241/2019.

¹⁹ Art. 19, c. 4 of the University Didactic Regulations.

²⁰ R.D. No. 3241/2019.

Article 16

Features and modalities for the final examination

The final exam aims to verify the student's ability to apply knowledge and consists of the presentation and discussion of an experimental thesis which reports the results of original research carried out on a scientific topic previously agreed with a supervisor belonging to the Degree Programme, who will supervise the activity in its different phases.

The final test for the award of the master's degree in Biological Sciences consists in the presentation and discussion by the graduating student of an experimental thesis elaborated by him/her in an original way which reports the results of original research carried out on a scientific topic previously agreed with a supervisor pertaining to the Degree course, who will supervise the activity in its various phases. The thesis activity may be carried out in a university or extra-university laboratory, even in another Italian or foreign location, under the guidance of a university supervisor and a co-supervisor, in the case of extra-university research centres.

The duration in CFU of the thesis is indicated for each curriculum in the teaching table, of which, only for students who carry out the thesis abroad within an Erasmus or similar programme, 1 credit for the preparation of the presentation and the discussion of the 'elaborate.

To be admitted to the final test, the student must have obtained all the training credits required by the course's teaching regulations, excluding those reserved for the final test.

The thesis discussion will take place in the presence of a commission appointed for this purpose and may include the use of audio-visual devices.

The judging commission for the final test, established in accordance with the provisions of paragraph 7 of the art. 29 of the RDA, having verified that it has been passed, establishes the degree mark, expressed in one hundred and tenths, considering the curriculum, the thesis, and the presentation. The Commission, in the case of reaching a mark of 110/110, can assign honours with a unanimous decision.

Article 17

Guidelines for traineeship and internship

1. Students enrolled in the Degree Program may decide to carry out internships or training periods with organisations or companies that have an agreement with the University. Traineeship and internship are not compulsory and contribute to the award of credits for the other training activities chosen by the student and included in the study plan, as provided for by Art. 10, par. 5, letters d and e, of Ministerial Decree 270/2004²¹.
2. The modalities and characteristics of traineeship and internship are regulated by the CCD with a specific regulation.
3. The University of Naples Federico II, by the Student Internship Office (<http://www.unina.it/didattica/tirocini-studenti>), ensures constant contact with the world of work, to offer students and graduates of the University concrete opportunities for internships and work experience and to promote their professional integration.

²¹ Traineeships ex letter d can be both internal and external; traineeships ex letter e can only be external.

Article 18

Disqualification of student status²²

A student who has not taken any examinations for eight consecutive academic years incurs forfeiture unless his/her contract stipulates otherwise. In any case, forfeiture shall be notified to the student by certified e-mail or other suitable means attesting to its receipt.

Article 19

Teaching tasks, including supplementary teaching, guidance, and tutoring activities

1. Professors and researchers carry out the teaching load assigned to them in accordance with the provisions of the RDA and the Regulations on the teaching and student service duties of professors and researchers and on the procedures for self-certification and verification of actual performance²³.
2. Professors and researchers must guarantee at least two hours of reception every 15 days (or by appointment in any case granted no longer than 15 days) and in any case guarantee availability by e-mail.
3. The tutoring service has the task of orienting and assisting students throughout their studies and of removing the obstacles that prevent them from adequately benefiting from attending courses, also through initiatives tailored to the needs and aptitudes of individuals.
4. The University ensures guidance, tutoring and assistance services and activities to welcome and support students. These activities are organised by the Schools and/or Departments under the coordination of the University, as established by the RDA in Article 8.

Article 20

Evaluation of the quality of the activities performed

1. The Didactic Coordination Commission implements all the forms of quality assessment of teaching activities envisaged by the regulations in force according to the indications provided by the University Quality Presidium.
2. To guarantee the quality of teaching to the students and to identify the needs of the students and all stakeholders, the University of Naples Federico II uses the Quality Assurance (QA)²⁴ System, developed in accordance with the document "Self-evaluation, Evaluation and Accreditation of the Italian University System" of ANVUR, using:
 - surveys on the degree of placement of graduates into the world of work and on post-graduate needs;
 - data extracted from the administration of the questionnaire to assess student satisfaction for each course in the curriculum, with questions relating to the way the course is conducted, teaching materials, teaching aids, organisation, facilities.

The requirements deriving from the analysis of student satisfaction data, discussed, and analysed by the Teaching Coordination Committee and the Joint Teachers' and Students' Committee

²² Art. 24, c. 5 of the University Didactic Regulations.

²³ R.D No. 2482//2020.

²⁴ The Quality Assurance System, based on a process approach and adequately documented, is designed in such a way as to identify the needs of the students and all stakeholders, and then translate them into requirements that the training offer must meet.

(CPDS), are included among the input data in the service design process and/or among the quality objectives.

3. The QA System developed by the University implements a process of continuous improvement of the objectives and of the appropriate tools to achieve them, ensuring that planning, monitoring, and self-assessment processes are activated in all the structures to allow the prompt detection of problems, their adequate investigation, and the design of possible solutions.

Article 21

Final Rules

The Department Council, on the proposal of the CCD, submits any proposals to amend and/or supplement these Rules for consideration by the Academic Senate.

Article 22

Publicity and Entry into Force

1. These Rules and Regulations shall enter into force on the day following their publication on the University's official notice board; they shall also be published on the University website. The same forms and methods of publicity shall be used for subsequent amendments and additions.
2. Annex 1 (Degree course structure) and Annex 2 (Teaching/Activity course sheet) are an integral part of this Didactic Regulations.

ANNEX 1.2

DEGREE PROGRAM DIDACTIC REGULATIONS

BIOLOGICAL SCIENCES

CLASS LM-6

School: Polytechnic of Basic Sciences

Department: Biology

Regulations in force from a.y. 2024-25

STUDY PLAN

KEY

Type of Educational Activity (TAF):

B = Characterising

C = Related or Supplementary

D = At the student's choice

E = Final examination and language knowledge

F = Further training activities

| Curriculum BIODIAGNOSTICS | | | | | | | | | |
|--|--------|--------|---------|-------|--|---|-----|------------------------------|----------------------|
| Year I | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Molecular genetics and cytogenetics | BIO/18 | Single | 8 | 64 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Pathophysiology of signal transduction | BIO/09 | Single | 8 | 64 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |
| Diagnostics and molecular traceability in plants | BIO/01 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| English language laboratory 2 | LIN/12 | Single | 4 | 32 | Frontal lesson | In-person/by distance | F | Further linguistic knowledge | Mandatory |
| Molecular and Applied Microbiology | BIO/19 | Single | 8 | 64 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Hygiene and epidemiology applied to diagnostics | MED/42 | Single | 6 | 48 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |

| Hematology | BIO/06 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
|--|--------|--------|---------|-------|---|--|-----|------------------------------|----------------------|
| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
| Further knowledge useful for job placement | | Single | 6 | 150 | | In-person/by-distance | F | Further training activities | Mandatory |
| Year II | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Biochemistry applied to diagnostics | BIO/10 | Single | 8 | 64 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Molecular pathology and pathophysiology | MED/04 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| Molecular Physioendocrinology | BIO/09 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
| Thesis activity | | | 36 | 900 | | | E | For the final test | Mandatory |

| Curriculum ENVIRONMENTAL BIOLOGY | | | | | | | | | |
|--|--------|--------|---------|-------|---|--|-----|------------------------------|----------------------|
| Year I | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Plant diversity and adaptations | BIO/01 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| Eco-physiological adaptations of plants | BIO/04 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Hygiene and risk management and environmental safety | MED/42 | Single | 8 | 64 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| English language laboratory 2 | LIN/12 | Single | 4 | 32 | Frontal lesson | In-person/by-distance | F | Further linguistic knowledge | Mandatory |
| Monitoring and phyto-remediation | BIO/03 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| Applied Microbiology | BIO/19 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Applied zoology | BIO/05 | Single | 6 | 48 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |

| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
|--|------------|---------------|----------------|--------------|--|---|------------|------------------------------|-----------------------------|
| Further knowledge useful for job placement | | Single | 6 | 150 | | In-person/by-distance | F | Further training activities | Mandatory |
| Year II | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Environmental alterations and ecotoxicology | BIO/07 | Single | 8 | 64 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| Plant ecology | BIO/03 | Single | 6 | 48 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |
| Cellular Markers and Animal Morphofunctional Adaptations | BIO/06 | Single | 8 | 64 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
| Thesis activity | | | 38 | 950 | | | E | For the final test | Mandatory |

| Curriculum BIOSECURITY | | | | | | | | | |
|--|------------|---------------|----------------|--------------|--|---|------------|------------------------------|-----------------------------|
| Year I | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Plant environmental protection | BIO/01 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| Animal environmental protection | BIO/05 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| Biosecurity and One-health | VET/03 | Single | 6 | 48 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |
| English language laboratory 2 | LIN/12 | Single | 4 | 32 | Frontal lesson | In-person/by-distance | F | Further linguistic knowledge | Mandatory |
| Hygiene and risk management and environmental safety | MED/42 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| Applied Microbiology | BIO/19 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Mutagenesis | BIO/18 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |

| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
|---|------------|------------------------|----------------|--------------|--|---|------------|------------------------------|-----------------------------|
| Further knowledge useful for job placement | | Single | 6 | 150 | | In-person/by-distance | F | Further training activities | Mandatory |
| Year II | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Advanced Biochemistry | BIO/10 | Advanced Biochemistry | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| | | Protein Bioinformatics | 6 | 48 | | | C | Related or Supplementary | |
| Molecular pathology and pathophysiology | MED/04 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| Environmental alterations and ecotoxicology | BIO/07 | Single | 8 | 64 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
| Thesis activity | | | 36 | 900 | | | E | For the final test | Mandatory |

| Curriculum NEUROSCIENCES | | | | | | | | | |
|---|------------|---------------|----------------|--------------|--|---|------------|----------------------------------|-----------------------------|
| Year I | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Pathophysiology of signal transduction | BIO/09 | Single | 8 | 64 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |
| Cytology and histology of the nervous system | BIO/06 | Single | 8 | 64 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| Neuroethology | BIO/05 | Single | 6 | 48 | Frontal lesson | In-person | B | Biodiversity and environment | Mandatory |
| English language laboratory 2 | LIN/12 | Single | 4 | 32 | Frontal lesson | In-person/by-distance | F | Further linguistic knowledge | Mandatory |
| Cellular neurophysiology | BIO/09 | Single | 8 | 64 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| Stem cells in the study of the nervous system | BIO/13 | Single | 6 | 48 | Frontal lesson | In-person | B | Nutrition and other applications | Mandatory |
| Microbiota and nervous system | BIO/19 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |

| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
|--|------------|---------------|----------------|--------------|--|---|------------|-----------------------------|-----------------------------|
| Further knowledge useful for job placement | | Single | 6 | 150 | | In-person/by-distance | F | Further training activities | Mandatory |
| Year II | | | | | | | | | |
| Title Course | SSD | Module | Credits | Hours | Type Activities (lectures, workshops, etc.) | Course Modalities (in-person, by distance) | TAF | Disciplinary area | Mandatory / optional |
| Systems Neurobiology | BIO/09 | Single | 8 | 64 | Frontal lesson | In-person | B | Biomedical | Mandatory |
| Neurogenetics | BIO/18 | Single | 6 | 48 | Frontal lesson | In-person | B | Biomolecular | Mandatory |
| Neuroactive organic substances | CHIM/06 | Single | 6 | 48 | Frontal lesson | In-person | C | Related or Supplementary | Mandatory |
| At the student's choice activity | | Single | 6 | 48 | Frontal lesson | In-person | D | At the student's choice | Mandatory |
| Thesis activity | | | 36 | 900 | | | E | For the final test | Mandatory |



ANNEX 2.1

DEGREE PROGRAM DIDACTIC REGULATIONS

BIOLOGICAL SCIENCES

CLASS LM-6

School: Polytechnic of Basic Sciences

Department: Biology

Didactic Regulations in force since the academic year 2024-25

Curriculum: Biodiagnostics

| | |
|--|---|
| Course: Molecular genetics and cytogenetics | Teaching Language: Italian |
| SSD (Subject Areas): BIO/18 | CREDITS: 8 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector defines and analyses the structure of genetic material and its levels of organization. It studies epigenetic modifications, the molecular basis of which he analyses. It investigates the genetic and molecular bases and deals with the practical applications of genetics and the molecular technologies derived from it in the biomedical sector. | |
| Objectives: The training objective is to transfer knowledge and specialist skills on the molecular bases of heredity, on the organization of genomes, on the meaning of mutations, on the most advanced techniques of molecular cytogenetics and DNA analysis, on the molecular mechanisms through which gene function in normal or altered conditions and the role of epigenetic modifications in the control of gene expression. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

| | |
|---|---|
| Course: Pathophysiology of signal transduction | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 8 |
| Course year: first | Type of Educational Activity: C - related or supplementary |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology analyses how the living organism achieves and maintains the homeostasis of its internal medium at the molecular, cellular and tissue level, in the context of changes in the surrounding environment. | |
| Objectives: | |

The training objective of the course is to provide advanced knowledge relating to cellular communication and the different strategies implemented by cells to respond to extracellular messages, as well as the consequences that arise from alterations of specific signaling pathways and how these are reflected on the entire organism.

Propaedeuticities:

None

Types of examinations and other tests:

Oral examination

| | | | |
|---|--|---|--|
| Course: Diagnostics and molecular traceability in plants | | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/01 | | CREDITS: 6 | |
| Course year: first | | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector studies plant biology at all levels of organization, including autotrophic prokaryotes, algae, and fungi, as well as their symbioses. Of these organisms, General Botany investigates, theoretically and experimentally, the aspects of structural and functional organization as well as the molecular bases of plant development. It also studies the development and application of functional methods to relevant investigations and related biotechnological applications. | | | |
| Objectives: The training objective of the course is to illustrate the theoretical, methodological, and experimental aspects of the use of molecular markers for the study of plant diversity and the traceability of plant organisms. | | | |
| Propaedeuticities: None | | | |
| Types of examinations and other tests: Written and oral examination | | | |

| | | | |
|---|--|---|--|
| Course: Molecular and Applied Microbiology | | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/19 | | CREDITS: 8 | |
| Course year: first | | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Distribution of microorganisms in nature and the role they play in the environment; interactions with other organisms and changes induced by the interaction between microorganism and host; microbiological techniques applied in the biotechnological field. | | | |
| Objectives: The course aims to provide students with knowledge relating to the application bases of microbiology and the ability to explain them even to non-experts. During the course the student is encouraged to read and comment on scientific articles and invited to summarize the results achieved by the experimenter in a complete but concise manner. | | | |
| Propaedeuticities: None | | | |
| Types of examinations and other tests: Oral examination | | | |

| | | | |
|---|--|---|--|
| Course: Hygiene and Epidemiology applied to diagnostics | | Teaching Language: Italian | |
| SSD (Subject Areas): MED/42 | | CREDITS: 6 | |
| Course year: first | | Type of Educational Activity: C - related or supplementary | |

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| Teaching Methods: In presence |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector has specific expertise in the field of hygiene applied to the environment, workplaces, preventive, rehabilitative and social medicine, epidemiology, public health, planning, organization and management of health services and health education. |
| Objectives: The course provides knowledge regarding the purpose of hygiene and epidemiology, the collection of data in epidemiology applied to diagnostics, the methods for measuring the state of health in the population and notes on public health, the types of epidemiological studies for the purpose to evaluate the risk to human health and related primary, secondary and tertiary prevention. |
| Propaedeuticities: None |
| Types of examinations and other tests: Written and oral examination |

| | |
|---|---|
| Course: Hematology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/06 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. The sector includes developmental biology and evolutionary biology of vertebrates, comparative anatomy, cell biology, animal cytology and histology as characterizing disciplines. | |
| Objectives: The course provides basic knowledge of human hematology with particular attention to laboratory aspects, aiming at acquiring the ability to frame the results of the blood count analysis and the main first-level blood chemistry analyzes and to formulate hematological diagnostic laboratory algorithms. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Written and oral examination | |

| | |
|--|---|
| Course: Biochemistry applied to diagnostics | Teaching Language: Italian |
| SSD (Subject Areas): BIO/10 | CREDITS: 8 |
| Course year: second | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Biochemical methodologies for the identification, characterization and analysis of biomolecules. Biochemical bases of pathological states. Biochemical specificities of cells, tissues, organs. | |
| Objectives: The student will have to demonstrate that they are capable of choosing between the different methodologies already in use, indicating any changes to be made to traditional tests or designing innovative tests for the dosage and identification of biomarkers. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: | |

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|------------------|
| Oral examination |
|------------------|

| | |
|---|---|
| Course: Molecular pathology and pathophysiology | Teaching Language: Italian |
| SSD (Subject Areas): MED/04 | CREDITS: 6 |
| Course year: second | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: General pathology and general pathophysiology; basic and applied research including the study of cellular pathology with specific skills in the field of oncology, immunology and immunopathology and genetic pathology. | |
| Objectives: The course aims to provide students with the elements to analyze the general and molecular pathophysiology and etiopathogenesis that contribute to the establishment of a disease state | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

| | |
|---|---|
| Course: Molecular physioendocrinology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 6 |
| Course year: second | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology studies the mechanisms and interrelationships of all vegetative functions in humans and the general foundations of endocrinology. | |
| Objectives: The training objective of the course is to provide to students the elements to be able to analyze in depth the role played by the endocrine system in homeostatic control and the molecular mechanisms involved. Students will be guided towards the development of integrated specialist skills relating to the biomedical sector. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

Curriculum: Environmental Biology

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|--|---|
| Course: Plant diversity and adaptations | Teaching Language: Italian |
| SSD (Subject Areas): BIO/01 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector studies plant biology at all levels of organization, including autotrophic prokaryotes, algae and fungi, as well as their symbioses. General Botany investigates, theoretically and experimentally, the aspects of structural and functional organization and their evolution of these organisms, to establish their relationships and interpret, from an evolutionary perspective, their structures, and functions, as well as their reproductive mechanisms. | |

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| It delves into the ways in which cells and organs acquire the ability to carry out specialized functions and the articulation of the processes that lead to the formation of complex organisms and the optimization of the reproductive process; highlights the relationships between cytological, ultrastructural, histological, anatomical, morphological, organographic, physiological aspects and the role of secondary metabolites, framing them in the characteristics of the development environment. |
| Objectives: Allow the acquisition of in-depth knowledge on the morpho-anatomical and reproductive adaptations of the main groups of terrestrial plants in relation to the biotic and abiotic environment of development. |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

| | |
|--|---|
| Course: Eco-physiological adaptations of plants | Teaching Language: Italian |
| SSD (Subject Areas): BIO/04 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The course includes the study of the functions and vital mechanisms of plant organisms. General aspects such as physiology, ecophysiology, biochemistry, and molecular biology of plants are therefore included in the sector. The sector includes both disciplines that describe the basic mechanisms of plant functioning and disciplines aimed at application aspects, such as the mechanisms underlying productivity control. | |
| Objectives: The main objective of this course is to acquire in-depth knowledge about the interactions between environmental and biotic factors and plant organisms, and about the ability of plants to adapt to the environment. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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|---|---|
| Course: Hygiene and risk management and environmental safety | Teaching Language: Italian |
| SSD (Subject Areas): MED/42 | CREDITS: 8 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Specific expertise in the field of hygiene applied to the environment, food and nutrition hygiene, community medicine, preventive, rehabilitative and social medicine, epidemiology, public health. | |
| Objectives: The student must demonstrate knowledge of the objectives and purposes of hygiene, risk assessment for human health and epidemiology, methods for data collection in epidemiology, risk prevention and mitigation, methods for measurement of the health status of the population, the main models of epidemiological studies and the main regulations aimed at protecting human and environmental health. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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|---|--------------------------------------|
| Course: Monitoring and phytoremediation | Teaching Language: Italian |
| SSD (Subject Areas): | CREDITS: |

| | |
|--|---|
| BIO/03 | 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Definition of environmental quality, nature conservation, environmental impact assessment, environmental education aimed at the study of ecological complexity and the compatible management and monitoring of natural resources. | |
| Objectives: The main objective of this course is to allow the acquisition of knowledge about plants as biomonitors and tools for environmental recovery. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

| | |
|--|---|
| Course: Applied microbiology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/19 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Distribution of microorganisms in nature and the role they play in the environment; basic and applied microbiological techniques, also in the biotechnological field | |
| Objectives: The course aims to provide students with knowledge relating to the application bases of microbiology and the ability to explain them even to non-experts. During the course the student is encouraged to read and comment on scientific articles and invited to summarize the results achieved by the experimenter in a complete but concise manner. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Written and oral examination | |

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|---|---|
| Course: Applied Zoology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/05 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: C - related or supplementary |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Study of metazoans at population, species, and community levels of organization. Research conducted through theoretical and experimental methodologies, in the field to study intra- and interspecific interactions and with the environment. Application relevance in the field of monitoring animal biodiversity and faunal aspects of environmental impact assessment and in that of fauna management and conservation. | |
| Objectives: Provide the theoretical and practical basis for the recognition of the main animal groups used in applied zoology. Ability to describe anthropogenic impacts on fauna, using the most suitable working methods for fauna monitoring. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Written and oral examination | |

| | | |
|--|---|--|
| Course: Environmental alterations and ecotoxicology | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/07 | CREDITS: 8 | |
| Course year: second | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Ecosystem responses to global changes and anthropogenic alterations, environmental sustainability, ecotoxicology, environmental quality indicators, environmental impact assessment, ecological aspects of environmental restoration and recovery, monitoring, and representation of ecological data. | | |
| Objectives: The aim of the course is to provide the knowledge and analysis tools necessary to evaluate the effects of the main human activities on natural ecosystems; knowledge of the main mitigation and restoration strategies for degraded environments. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Oral examination | | |

| | | |
|--|---|--|
| Course: Plant ecology | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/03 | CREDITS: 6 | |
| Course year: second | Type of Educational Activity: C - related or supplementary | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Distribution, adaptive strategies, use of resources and interrelationships with the environment of prokaryotic and eukaryotic photosynthetic living things. | | |
| Objectives: Study of the role of plant organisms in the ecosystem and their relationships with the biotic and abiotic environment. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Written and oral examination | | |

| | | |
|---|---|--|
| Course: Cellular markers and animal morpho-functional adaptations | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/06 | CREDITS: 8 | |
| Course year: second | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. From a structural point of view, the fundamental correlations between the molecular, cellular, tissue and organ levels are explored in depth, from an embryological-evolutionary point of view, the relationships between phylogeny and morphogenesis are studied to identify, also with a comparative approach, the interconnection between structure, function, and adaptation. The sector includes developmental biology and evolutionary biology of vertebrates, comparative anatomy, cell biology, animal cytology and histology as characterizing disciplines. | | |
| Objectives: | | |

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| The aim of the course is to introduce and explore the theme of the relationship between the environment, development, and evolution through the "eco-evo-devo" approach. The course aims to provide specialized knowledge on the theoretical, methodological, and practical aspects of cellular adaptation mechanisms in relation to environmental conditions. |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

Curriculum: Biosafety

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|--|---|
| Course: Plant environmental protection | Teaching Language: Italian |
| SSD (Subject Areas): BIO/01 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector studies plant biology at all levels of organization, including autotrophic prokaryotes, algae and fungi, as well as their symbioses. It highlights the relationships between cytological, ultrastructural, histological, anatomical, morphological, organographic, physiological aspects and the role of secondary metabolites, framing them in the characteristics of the development environment. It also studies the development and application of functional methods for investigations of relevance and related biotechnological applications. | |
| Objectives: Knowledge of the cytological, histological, and anatomical responses of plant organisms (including autotrophic prokaryotes, algae and fungi, as well as their symbioses) to environmental modifications. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

| | |
|---|---|
| Course: Animal environmental protection | Teaching Language: Italian |
| SSD (Subject Areas): BIO/05 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Study of metazoans and their evolution at population, species, and community levels. Research, conducted through theoretical and experimental methodologies to investigate intra- and interspecific interactions and with the environment. Zoology, a science that characterizes the sector, constitutes a basic discipline in the field of life sciences also with reference to environmental education and the management and conservation of fauna. | |
| Objectives: Knowledge of ecosystem dynamics, with reference to ecological balances, repercussions on human health and biodiversity. Knowledge of potential mythic approaches for wildlife conservation. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

| | |
|--|--------------------------------------|
| Course: Biosecurity and One-health | Teaching Language: Italian |
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| | | |
|---|---|----------------------|
| SSD (Subject Areas): VET/03 | | CREDITS: 6 |
| Course year: first | Type of Educational Activity: C - related or supplementary | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector includes the disciplines and research topics inherent to the etiopathogenesis of diseases, biotechnologies aimed at the etiopathogenic study of nosological entities of pets, livestock, wild and laboratory animals, also included in the sector of ichthyopathology, environmental pathology and of teratology. | | |
| Objectives: The course aims to provide the basis of systemic thinking for the improvement of surveillance programs, timely response to emergencies by applying the One Health approach. It will make students understand the need for an integrated and intersectoral approach towards achieving the SDGs of Agenda 2030 and will provide basic knowledge on the main issues relating to health at the human/animal/environment interface | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Oral examination | | |

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|---|---|--------------------------------------|
| Course: Hygiene and risk management and environmental safety | | Teaching Language: Italian |
| SSD (Subject Areas): MED/42 | | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The teaching will resume the basics of preventive medicine, epidemiology, and public health. It will focus on the main themes of general and applied hygiene, especially as regards hygiene applied to the environment and food hygiene. | | |
| Objectives: The student must demonstrate knowledge of the objectives and purposes of hygiene, risk assessment for human health and epidemiology, the methods for data collection in epidemiology, risk prevention and mitigation and the main regulations aimed at to the protection of human health and the environment, with mention of food hygiene. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Oral examination | | |

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| Course: Applied microbiology | | Teaching Language: Italian |
| SSD (Subject Areas): BIO/19 | | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Distribution of microorganisms in nature and the role they play in the environment; basic and applied microbiological techniques, also in the biotechnological field | | |
| Objectives: The course aims to provide students with knowledge relating to the application bases of microbiology and the ability to explain them even to non-experts. During the course the student is encouraged to read and comment on scientific articles and invited to summarize the results achieved by the experimenter in a complete but concise manner. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Written and oral examination | | |

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| Course: Mutagenesis | | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/18 | | CREDITS: 6 | |
| Course year: first | | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Studies of the regulation of gene expression and the mechanisms of mutagenesis. It studies epigenetic modifications and its molecular basis. | | | |
| Objectives: The objective of the course is the in-depth discussion of the nature and mechanisms of onset of mutations and epigenetic modifications, of the main in vitro and in vivo mutagenesis tests, of their applications for the monitoring of air, water and soil and their biotechnological applications in the industrial and biomedical sector. | | | |
| Propaedeuticities: None | | | |
| Types of examinations and other tests: Oral examination | | | |

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| Course: Advanced biochemistry | | Teaching Language: Italian | |
| SSD (Subject Areas): Advanced biochemistry BIO/10 Protein bioinformatics BIO/10 | | CREDITS: 6 6 | |
| Course year: second | | Type of Educational Activity: Advanced biochemistry B - characterizing Protein bioinformatics C - related or supplementary | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Biological processes at the molecular level, the structure, properties, and functions of biomolecules, including proteins, enzymatic catalysis, the biochemical mechanisms of the functions of prokaryotic cells, plants, animals and humans; enzymology, molecular structural biology, biocrystallography, biophysics, computational biochemistry and bioinformatics; recombinant molecular technologies for engineering proteins. | | | |
| Objectives: The aim of the course is to provide students with knowledge of the principles underlying the structure and function of proteins and enzymatic catalysis, of the role of proteins in the life of the cell (folding, topogenesis, post-translational modifications, degradation) as well as bioinformatic tools for the study of proteins. | | | |
| Propaedeuticities: None | | | |
| Types of examinations and other tests: Oral examination | | | |

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|---|--|---|--|
| Course: Molecular pathology and pathophysiology | | Teaching Language: Italian | |
| SSD (Subject Areas): MED/04 | | CREDITS: 6 | |
| Course year: second | | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: General pathology and general pathophysiology; basic and applied research including the study of cellular pathology with specific skills in the field of oncology, immunology and immunopathology and genetic pathology. | | | |

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| Objectives: The course aims to provide students with the elements to analyze the general and molecular pathophysiology and etiopathogenesis that contribute to the establishment of a disease state |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

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| Course: Environmental alterations and ecotoxicology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/07 | CREDITS: 8 |
| Course year: second | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Ecosystem responses to global changes and anthropogenic alterations, environmental sustainability, ecotoxicology, environmental quality indicators, environmental impact assessment, ecological aspects of environmental restoration and recovery, monitoring, and representation of ecological data. | |
| Objectives: The course aims to provide students with the elements to analyze the general and molecular pathophysiology and etiopathogenesis that contribute to the establishment of a disease state | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

Curriculum: Neuroscience

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| Course: Pathophysiology of signal transduction | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 8 |
| Course year: first | Type of Educational Activity: C - related or supplementary |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology analyzes how the living organism achieves and maintains the homeostasis of its internal medium at the molecular, cellular and tissue level, in the context of changes in the surrounding environment. | |
| Objectives: The training objective of the course is to provide advanced knowledge relating to cellular communication and the different strategies implemented by cells to respond to extracellular messages, as well as the consequences that arise from alterations of specific signaling pathways and how these are reflected on the entire organism. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Cytology and histology of the nervous system | Teaching Language: Italian |
| SSD (Subject Areas): BIO/06 | CREDITS: 8 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |

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| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector addresses the problem of form in animal biology, at its various levels of organization, in the dual morpho-functional and embryological-evolutionary perspective. From a structural point of view, the fundamental correlations between the molecular, cellular, tissue and organ levels are explored in depth, with the use of advanced microscopy, cytochemical and immunohistochemical techniques. The interconnection between structure, function and adaptation is also studied, in various processes such as endocrine and neural integration. Among the disciplines characterizing the sector are animal cytology and histology and cell biology. |
| Objectives: The course aims to provide students with specialized knowledge of cytology and histology of the nervous system. |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

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| Course: Neuroethology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/05 | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Study of metazoans and their evolution at the cellular and organismal levels of organization. Research, conducted through theoretical and experimental methodologies that investigate functional organization, and behavior. | |
| Objectives: Understanding the neural basis of animal behavior through an integrated approach between neuroscience and ethology. Understanding of the main behavioral models and analysis of the sensorimotor systems of an organism in innate and learned behaviors. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Written and oral examination | |

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| Course: Cellular neurophysiology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 8 |
| Course year: first | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology studies biophysics, the electrophysiological and functional mechanisms of transport and communication systems in biological membranes, as well as the mechanisms and interrelationships of all vegetative functions. | |
| Objectives: The Cellular Neurophysiology course aims to provide students with advanced knowledge regarding the physiology of neurons, the biophysical characteristics of neuronal membranes, the mechanisms that regulate nervous activity and the metabolism of the cells of the nervous system, as well as the tools basic methodologies necessary to operate in the field of cellular neurophysiology. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Stem cells in the study of the nervous system | Teaching Language: Italian |
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| SSD (Subject Areas): BIO/13 | | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Cellular and applied biology studies the fundamental mechanisms that regulate the homeostasis and development of tissues and living organisms. It also promotes the strengthening of biotechnological applications and their technological transfer. The learning path of cellular and applied biology is focused on the generation and characterization of in vivo, in vitro and ex vivo study models useful for understanding the processes of cellular differentiation and tissue ontogeny. | | |
| Objectives: The course aims to provide students with knowledge relating to the cellular and molecular mechanisms underlying the specification and differentiation processes of neuronal stem cells, by in vitro and ex-vivo models. The student will have the opportunity to learn how these processes are functional to understanding the physiology and pathology of the nervous system. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Written and oral examination | | |

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|---|---|----------------------|
| Course: Microbiota and nervous system | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/19 | | CREDITS: 6 |
| Course year: first | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector studies the interactions between microorganisms and between microorganism and host. | | |
| Objectives: The training objective of the course is to provide advanced knowledge relating to the ways in which microorganisms establish relationships with the host, both beneficial and pathological, with reference to the molecular mechanisms underlying the gut-brain relationship. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: Oral examination | | |

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|---|---|----------------------|
| Course: Systems neurobiology | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/09 | | CREDITS: 8 |
| Course year: second | Type of Educational Activity: B - characterizing | |
| Teaching Methods: In presence | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology studies biophysics, the electrophysiological and functional mechanisms of transport and communication systems in biological membranes, as well as the mechanisms and interrelationships of all vegetative functions | | |
| Objectives: The course aims to provide students with in-depth knowledge relating to the higher functions of the Central and Peripheral Nervous System. The aim of the teaching is also to allow the student to extend the study methodology to any structural, functional, and molecular aspect of the Nervous System. | | |
| Propaedeuticities: None | | |

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| Types of examinations and other tests: Oral examination |
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| Course: Neurogenetics | Teaching Language: Italian |
| SSD (Subject Areas): BIO/18 | CREDITS: 6 |
| Course year: second | Type of Educational Activity: B - characterizing |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Studies the methods of transmission, modification, and expression of hereditary characteristics at the level of individuals and populations. He studies epigenetic modifications, analyzing the molecular basis, heredity and consequences at the phenotypic level. He studies the regulation of gene expression. | |
| Objectives: The course aims to provide students with the theoretical knowledge necessary to understand the genetic basis of hereditary human neurodegenerative diseases, both simple and complex, the methodological tools for molecular diagnosis and the fundamental notions for the functional characterization of the genes responsible for a pathological phenotype. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Neuroactive organic substances | Teaching Language: Italian |
| SSD (Subject Areas): CHIM/06 | CREDITS: 6 |
| Course year: second | Type of Educational Activity: C - related or supplementary |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Study of carbon compounds, both natural and synthetic, including amino acids and sugars. Elucidation of the mechanisms through which organic compounds are formed and transformed both in the laboratory and in natural and environmental systems, their supramolecular interactions, structural characterization, and structure-reactivity relationships. Design of biologically active organic compounds in view of their possible pharmaceutical use. | |
| Objectives: Provide students with knowledge of the chemical synapse, role of neurotransmitters, identification of biosynthetic pathways and metabolic transformations of endogenous neurotransmitters, classification of neuroactive organic substances, knowledge of their neuronal recognition mechanisms and methodological tools necessary to design a neuroactive drug. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

At Student's choice courses

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| Course: Molecular bases of aging and neurodegenerative diseases | Teaching Language: Italian |
| SSD (Subject Areas): BIO/11 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |

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| Teaching Methods: In presence |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Of interest in this sector is the analysis of the biochemical and evolutionary characteristics of nucleic acids, the interactions between nucleic acids and proteins, between proteins and proteins and the relationships existing between the three-dimensional structure of proteins and nucleic acids and the biological functions performed by them in eukaryotes. Particular attention is paid to the macromolecules that are involved in the transcription and translation of the information contained in nucleic acids, to the macromolecules that are responsible for the phenomena of control of gene expression. |
| Objectives: Provide advanced skills on the molecular aspects of brain aging, neurodegenerative diseases, as well as on the mechanisms shared by these phenomena, focusing attention on the processes of regulation of transcription and translation of genetic information. The course will also delve into molecular principles and strategies for diagnostics and therapeutic treatment. |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

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| Course: Computational biochemistry in diagnostics | Teaching Language: Italian |
| SSD (Subject Areas): BIO/10 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Biological processes at the molecular level; the molecular and regulatory mechanisms of biotransformations, enzymatic catalysis, gene expression and regulation, signal transduction, intra- and intercellular communications; growth, differentiation, apoptosis; computational biochemistry and bioinformatics. | |
| Objectives: The course aims to provide students with in-depth knowledge that will enable them to use NGS data for the in-silico profiling of biochemical phenotypes, with particular attention to the structural and functional characterization of gene variants. | |
| Propaedeuticities: Biochemistry, Molecular Biology. | |
| Types of examinations and other tests: Oral examination | |

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| Course: Plant bioindicators | Teaching Language: Italian |
| SSD (Subject Areas): BIO/03 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The definition of environmental quality, nature conservation, environmental impact assessment, environmental education aimed at the study of ecological complexity and the compatible management and monitoring of natural resources. | |
| Objectives: The course aims to provide students with in-depth knowledge that will enable them to use NGS data for the in-silico profiling of biochemical phenotypes, with particular attention to the structural and functional characterization of gene variants. | |
| Propaedeuticities: Botany and laboratory | |

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| Types of examinations and other tests: Oral examination |
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| Course: Molecular and cellular biology of the retina | Teaching Language: Italian |
| SSD (Subject Areas): BIO/11 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Of interest in this sector is the analysis of the biochemical and evolutionary characteristics of nucleic acids, the interactions between nucleic acids and proteins, between proteins and proteins and the relationships existing between the three-dimensional structure of proteins and nucleic acids and the biological functions performed by them in eukaryotes. Particular attention is paid to the macromolecules that are involved in the transcription and translation of the information contained in nucleic acids, to the macromolecules that are responsible for the phenomena of control of gene expression. | |
| Objectives: Provide advanced skills on the genetic and molecular aspects of retinal development, maintenance and function by focusing attention on the molecular mechanisms underlying these processes. The course will also delve into advanced molecular principles and strategies for the diagnostics and therapeutic treatment of retinal neurodegenerative diseases. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Environmental botany and global changes | Teaching Language: Italian |
| SSD (Subject Areas): BIO/03 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The definition of environmental quality, nature conservation, environmental impact assessment, environmental education aimed at the study of ecological complexity and the compatible management and monitoring of natural resources. | |
| Objectives: The course examines the environmental quality and the state of degradation of the vegetal component of terrestrial habitats especially in relation to global changes. The natural and anthropogenic disturbance factors of degradation will be analyzed to identify mitigation strategies and to define recovery projects for degraded environments. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Written and oral examination | |

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|---|--|
| Course: Cytochemistry and histochemistry | Teaching Language: Italian |
| SSD (Subject Areas): BIO/06 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: | |

The sector addresses the problem of form in animal biology, at its various levels of organization, in the dual morpho-functional and embryological-evolutionary perspective. From a structural point of view, the fundamental correlations between the molecular, cellular, tissue and organ levels are explored in depth, with the use of advanced techniques: microscopic, cytochemical, immunohistochemical, karyological, cytotoxicological, including the possible application aspects of biotechnology and specific modifications from environmental alterations. Among the disciplines characterizing the sector are animal cytology and histology and cell biology.

Objectives:

The course aims to prepare students for the study of cells and tissues and provide specialized knowledge on cyto/histochemical staining and the main techniques for in situ molecular detection to be applied in the field of cytodiagnosics and research.

Propaedeuticities:

None

Types of examinations and other tests:

Oral examination

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| Course: Comparative hematology | | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/06 | | CREDITS: 6 | |
| Course year: first/second | | Type of Educational Activity: D - At the student's choice | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, at its various levels of organization and in the dual structural and embryological-evolutionary perspective. The sector includes developmental biology and evolutionary biology of vertebrates, comparative anatomy, cell biology, animal cytology and histology as characterizing disciplines. | | | |
| Objectives: The course provides basic knowledge of animal hematology regard to the laboratory aspects of the sampling techniques, preparation and study of blood samples and hematopoietic tissues in the various classes of vertebrates from fish to mammals, with the acquisition of the ability to frame the results of the blood count analysis for the evaluation of the animal's health status | | | |
| Propaedeuticities: None | | | |
| Types of examinations and other tests: Written and oral examination | | | |

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|---|--|--|--|
| Course: Endocrinology applied to illicit substances | | Teaching Language: Italian | |
| SSD (Subject Areas): BIO/06 | | CREDITS: 6 | |
| Course year: first/second | | Type of Educational Activity: D - At the student's choice | |
| Teaching Methods: In presence | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, from a structural and embryological-evolutionary perspective. The fundamental correlations between the molecular, cellular, tissue and organ levels, and the modifications caused by environmental alterations, are explored in depth. The interconnection between structure, function and adaptation is studied with a comparative approach, in various processes such as endocrine and neural integration, reproduction, development, immune defense. | | | |
| Objectives: The course proposes the study: 1) of the role of drugs in human history; 2) their characteristics and effects on the endocrine and nervous systems, on peripheral organs and tissues; 3) the role of drugs as environmental contaminants, and the effects they have on the environment and on the animal organisms that encounter them. | | | |
| Propaedeuticities: None | | | |

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| Types of examinations and other tests: Oral examination |
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| Course: Comparative endocrinology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/06 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The disciplines included in the sector represent an integrated set of skills that addresses the problem of form in animal biology, from a structural and embryological-evolutionary perspective. The fundamental correlations between the molecular, cellular, tissue and organ levels, and the modifications caused by environmental alterations, are explored in depth. The interconnection between structure, function and adaptation is studied with a comparative approach, in various processes such as endocrine and neural integration, reproduction, development, immune defense. | |
| Objectives: The training course will provide students with the appropriate tools for understanding the relationships mediated by the endocrine system between different anatomical and functional districts and between these and the environment. The course will delve into the evolutionary processes that have led to the modifications of the endocrine system in the different classes of vertebrates. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Exercise physiology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology analyzes the integrated functioning of the different organs and systems during motor activities and studies the potential applications of this knowledge in the sports field. | |
| Objectives: The teaching aims to provide knowledge on metabolic and organ and system adaptations in response to physical exercise, both from the point of view of each individual organ and system, and as an integrative response. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Endocrine pathophysiology of nutrition | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology studies the general foundations of endocrinology and evaluates the nutritional characteristics of foods, the state of nutrition, energy expenditure and need, the physiological use of nutrients in the diet. | |
| Objectives: | |

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| The course aims to provide students with in-depth knowledge relating to the higher functions of the Endocrine Pathophysiology of Nutrition, with reference to the pathologies associated with metabolic syndrome: obesity, diabetes, lentin and insulin resistance, hepatic steatosis and endoplasmic reticulum stress. |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

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| Course: Photobiology and biochemistry of photosynthesis | Teaching Language: Italian |
| SSD (Subject Areas): BIO/04 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Study of the biochemical and molecular functions and mechanisms of plant metabolism, in particular the photobiology and bioenergetics of photosynthesis. | |
| Objectives: The student must know the evolutionary and biochemical mechanisms underlying the origin of chloroplasts in photosynthetic organisms, both in the green and red lineages. The student must know the most common experimental approaches and modern technologies used in the sector of plant biochemistry in photosynthetic organisms. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Industrial and occupational hygiene | Teaching Language: Italian |
| SSD (Subject Areas): MED/42 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector has specific expertise in the field of hygiene applied to the environment, workplaces, preventive, rehabilitative and social medicine, epidemiology, public health, planning, organization and management of health services and health education. | |
| Objectives: The course provides knowledge regarding the purposes of hygiene and epidemiology in the workplace, the methods for collecting data in epidemiology, the measurement of the state of health in the population, especially in the occupational context, the main epidemiological models, and the measures to evaluate risk and related prevention in the workplace. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Hygiene, environment and health | Teaching Language: Italian |
| SSD (Subject Areas): MED/42 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |

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| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector has specific expertise in the field of hygiene applied to the environment, workplaces, preventive, rehabilitative and social medicine, epidemiology, public health, planning, organization and management of health services and health education. |
| Objectives: The course provides knowledge on analytical techniques with critical evaluation of the implementation phases and attention to data quality. Students will learn to identify sampling scenarios, conduct analyzes of environmental pollutants and interpret industrial hygiene data, evaluating relationships and discriminating confounding factors. |
| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

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| Course: Bioinformatics laboratory | Teaching Language: Italian |
| SSD (Subject Areas): BIO/10 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Biological processes at the molecular level, the structure, properties, and functions of biomolecules, including proteins and nucleic acids; the molecular and regulatory mechanisms of gene expression and regulation, signal transduction, intra- and intercellular communications; the biochemical mechanisms of cell functions; molecular structural biology, computational biochemistry, and bioinformatics. | |
| Objectives: The course aims to provide students with in-depth knowledge that will make them autonomous and aware in the planning, execution, and interpretation of bioinformatic analyses, with particular attention to the ability to communicate the result outside of their scientific context. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Diagnostic methodologies in general and clinical pathology | Teaching Language: Italian |
| SSD (Subject Areas): MED/05 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Diagnostic-clinical pathology and laboratory methodology in cytology, cytopathology, immunohematology, and genetic pathology and in the application of cellular and molecular methodologies to diagnostics in human pathology. | |
| Objectives: The course aims to provide the student with basic knowledge of cellular and molecular methodologies for diagnostics in human pathology. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Molecular neurobiology | Teaching Language: Italian |
| SSD (Subject Areas): BIO/11 | CREDITS: 6 |

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| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector is interested in the biochemical and evolutionary characteristics of nucleic acids and proteins and the relationships between the three-dimensional structure of proteins and nucleic acids. Particular attention is paid to the macromolecules that are involved in the transcription and translation of the information contained in nucleic acids, to the macromolecules that are responsible for the phenomena of control of gene expression, proliferation, differentiation, to the macromolecules that allow the development of multicellular organism animals. | |
| Objectives: The course aims to provide an in-depth overview of the molecular and technological aspects in the field of neuroscience, focusing on the molecular mechanisms underlying the differentiation of stem cells of the human cerebral cortex during embryonic development and the methodologies for the creation of models of human pathologies from cells of patient. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Adipose organ and body weight control | Teaching Language: Italian |
| SSD (Subject Areas): BIO/09 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Physiology studies the specialized functions of individual cells and the general foundations of endocrinology. | |
| Objectives: The training path of the course intends to provide the student with the elements to understand problems inherent to the morphology and function of the adipose organ, to the mechanisms underlying the different functions carried out by the white and brown adipose tissues as well as to the endocrine role of the adipose organ, which will allow understanding the role played by the adipose organ in the control of body weight and the pathophysiological consequences associated with adipose organ dysfunction. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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| Course: Quality, safety and traceability standards in the food company | Teaching Language: Italian |
| SSD (Subject Areas): MED/42 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Expertise in the field of hygiene applied to the environment, food hygiene and nutrition. | |
| Objectives: The training objective of the course is to provide in-depth knowledge of the national and international framework regarding standards and methods of the food sector; learners will acquire skills on the contaminations that affect the quality of the food supply chain along the entire production chain, using risk management strategies. | |

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| Propaedeuticities: None |
| Types of examinations and other tests: Oral examination |

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|---|--|
| Course: Parasitological diagnostics | Teaching Language: Italian |
| SSD (Subject Areas): VET/06 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The sector represents a cultural-scientific complex that studies fungi, protozoa and metazoa (parasites) which cause pathological phenomena in animal organisms (hosts) normally defined as "parasitic diseases", many of which are zoonoses; develops basic knowledge on parasites, their biology and the parasite-host-environment relationship, addressing the systematic, evolutionary, genetic, ecological, immunological, physiological and pathological aspects, also through the use of statistical-mathematical, biochemical and molecular. | |
| Objectives: The course aims to provide students with specialized knowledge aimed at acquiring mastery in the diagnosis of protozoan and metazoan parasites in humans and animals, with reference to those of a zoonotic nature. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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|---|--|
| Course: One-Health and emerging zoonoses | Teaching Language: Italian |
| SSD (Subject Areas): VET/05 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The contents of the sector concern infectious and diffusive pathologies of all domestic (mammals, birds, fish) and wild species, with repercussions on public health and on the quantity and quality of livestock production. | |
| Objectives: Understanding of the relationship between the concept of One Health (OH) and the strict relevance of zoonoses and the resurgence of old zoonoses. The relationship between zoonoses and the protection of public health will be addressed with a modern epidemiological approach that can effectively clarify the health problems arising from the effects of globalization and climate change. | |
| Propaedeuticities: None | |
| Types of examinations and other tests: Oral examination | |

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|--|--|
| Course: Environmental Biocatalysis | Teaching Language: Italian |
| SSD (Subject Areas): BIO/10 | CREDITS: 6 |
| Course year: first/second | Type of Educational Activity: D - At the student's choice |
| Teaching Methods: In presence | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: Metodologie biochimiche per l'identificazione, caratterizzazione e analisi delle biomolecole. La biochimica dell'ambiente, dell'inquinamento. | |

Objectives:

The course aims to provide students with an overview of biological alternatives regarding the use of enzyme in environmental biocatalysis.

Propaedeuticities:

None

Types of examinations and other tests:

Oral examination



ANNEX 2.2

DEGREE PROGRAM DIDACTIC REGULATIONS BIOLOGICAL SCIENCES

CLASS LM-6

School: Polytechnic of Basic Sciences

Department: Biology

Regulations in force from a.y. 2024-25

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|---|---|--|
| Training Activity: English language laboratory 2 (LIN/12) | Training Activity Language: English | |
| Content of the activities consistent with the training objectives of the course: Additional linguistic knowledge | CFU: 4 | |
| Course year: first | Type of Training Activity: F - Further training activities | |
| Teaching Methods: in-person/by distance teaching | | |
| Objectives: Acquisition of advanced notions for understanding scientific texts and articles in English. Independent use of the language for the exposition of scientific topics and technical discussions. Clear and detailed writing of your opinions in English. Strengthening and developing autonomy in English conversation. | | |
| Propaedeuticities: None | | |
| Types of examinations and other tests: aptitude | | |

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|---|---|--|
| Training Activity: under Art. 10, c. 5, letter d | Training Activity Language: Italian | |
| Content of the activities consistent with the training objectives of the course: Other knowledge useful for job placement; IT and telematics skills; training and orientation periods) that contribute to the achievement of the CdS objectives | CFU: 6 | |
| Course year: first/second | Type of Training Activity: F - Further training activities | |
| Teaching Methods: in-person/by distance | | |

Objectives:

Acquisition of knowledge of the complex world of work in the organic sector and consolidation of one's perception and awareness regarding the relationship between university preparation and professional activities.

Propaedeuticities:

None

Is a propaedeuticity for:

None

Types of examinations and other tests:

aptitude