UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

COURSE OF STUDY : Medicine and Surgery
ACADEMIC YEAR: 2024-2025; I YEAR – I semester
ACADEMIC SUBJECT: Cellular Biology (4 cfu)
INTEGRATED COURSE: Applied and Molecular Biology (9 ETCS)

AK course

General information	
Year of the course	I YEAR – I semester
Academic calendar (starting and ending date)	I sem.
Credits (CFU/ETCS):	**Academic subject**: 4 CFU - **Integrated Course**: 9 CFU.
SSD	Experimental Biology – BIO/13
Language	Italian
Mode of attendance	Mandatory

Professor/ Lecturer	
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Telephone	080 5448553
Department	DEPARTMENT OF TRANSLATIONAL BIOMEDICINE AND NEUROSCIENCE (DiBraiN)
address	"Nuovo Complesso di Scienze Biomediche", Policlinico - Piazza Giulio Cesare 11 BARI
Virtual room	Teams Cod: 8hcpvlw
Office Hours (and modalities: e.g., by appointment, on line, etc.)	Students will be welcomed on Tuesday (H 10-11) by previous appointment via e-mail

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
100	*40*	---	*60*
CFU/ETCS			
4	1,6	---	2,4

Learning Objectives	The Biology course aims to provide students with the basics of the scientific method and the language of cellular biology, as well as knowledge of the biological processes of cells. In particular the teaching activity, in line with the declaration of the Scientific Disciplinary Sector BIO/13, has the attainment target to let students to understand: - the constructive logic of biological structures at the different levels of organization of living beings; - the mechanisms responsible of functioning and reproduction of the cell; - the structure and function of nucleic acids and the flow of information in cells; - the structure-function relationship and molecular recognition as the basis of the action of informational molecules and the expression of genetic information in cells - the principles underlying the diversification of biological units; - the dynamic character of living matter, as a result of the interactions between biological units and the environment - biotechnological applications relating to the knowledge of the above processes
Course prerequisites	It is a first year, first semester course, for which there are no specific pre-requisites different from those required for access to the degree course.
Teaching strategie	Lectures with the aid of Power Point, textbooks and teaching material provided by the teacher to the students.
Expected learning outcomes in terms of	The learning outcomes expected at the end of the course include knowledge and understanding of the topics presented in class, analysis and synthesis skills and independent judgment on the topics and the acquisition of appropriate language with clear, specialist terminology. The specific learning outcomes of the program are consistent with the general provisions of the Bologna Process and the specific provisions of Directive 2005/36/EC. They are found within the European Qualifications Framework (Dublin descriptors).
Knowledge and understanding on:	The objective of the CELLULAR BIOLOGY course is to let the students to understand: ○ the constructive logic of the fundamental biological structures at the different levels of organization of living matter ○ the general principles that govern the functioning of the different biological units both in terms of the energetic aspect and the informational aspect ○ the principles that govern the diversification of biological units ○ the fundamental mechanisms underlying cellular differentiation and proliferation processes. ○ the dynamic character of living matter as a result of interactions between biological units and the environment
Applying knowledge and understanding on:	Ability to develop adequate skills for the application of the contents of the discipline for critical and autonomous arguments on: - knowledge of the organization of prokaryotic and eukaryotic cells and of the basic biological processes of cells and organisms; - the cell cycle and its regulation; - the main methodologies for studying biological processes.

Soft skills	• *Making informed judgments and choices* The student must be able to acquire adequate autonomy of judgement, both within his own field of work and outside of it, which can be achieved through the establishment of a solid scientific culture of which, knowledge of the cellular structure and related mechanisms, represent an important component.
	• Communicating knowledge and understanding The student must be able to expose and explain, in a simple but rigorous way, even to a non-expert audience, the cellular structure and its mechanisms. • Capacities to continue learning The student must be able to connect and integrate the knowledge learned with that of subsequent courses. Furthermore, students must be able to update their knowledge in the field of cell biology, consulting scientific publications for continuous updating of knowledge in the biomedical field.

Syllabus **Content knowledge:**	ORGANISMS AND ENVIRONMENT. Definition of ecosystem. Flow of energy and matter. Autotrophic and heterotrophic organisms. Characteristics of living things and cellular theory. Understanding of the cell as a structural and functional unit in which the fundamental and general characteristics of living organisms are recognisable. Evolution. STRUCTURE OF BIOLOGICAL MOLECULES (an introduction): Chemistry of living being. Biomolecules in the cell, structure and properties. Water, sugars, lipids and proteins. Based on the knowledge acquired in the integrated chemistry and physics courses, the course explore the relationship between the structure and function of nucleic acids (DNA and RNA) and proteins, with particular reference to the function of enzymes as biological catalysts. The ribozymes. THE CELL: STRUCTURE AND FUNCTION Cellular and macromolecular organization. Prokaryotic cell and eukaryotic cell. Definition of viruses as intracellular parasites, viroids and prions. The similarities and differences between viruses, prokaryotic cells and eukaryotic cells. The membranes. structure, function.Transport across membranes. Simple diffusion, facilitated diffusion, active transport. Signal transduction mechanisms: Messengers and receptors. Chemical signals and cellular receptors. Receptors associated with G proteins. Receptors associated with protein kinases. Cytoplasmic and nuclear receptors. Intracellular compartments: structure and function. The endoplasmic reticulum. The Golgi complex. Endocytosis and exocytosis. Endosomes. The lysosomes. The peroxisomes. Energy metabolism: -chemotrophic: Aerobic respiration. The mitochondrion: structure and function. Energetic role of the mitochondrion. -phototrophic: photosynthesis. The chloroplast: structure and function. Similarities and differences with respect to the mitochondrion. The cytoskeleton and cell motility. Cytoskeletal systems. Microtubules. Microfilaments. Intermediate filaments. Structure and function. Extracellular structures, adhesion and cell junctions (Outline). THE STRUCTURAL BASIS OF CELLULAR INFORMATION: DNA, CHROMOSOMES AND NUCLEUS. The nucleus: structure and function. Nucleolus. The nuclear envelope and its functions. Structure of genomes and genes: a) Size, organization and informational content of prokaryotic and eukaryotic genomes. Coding and non-coding DNA. b) Gene structure in eukaryotes and prokaryotes. Concept of promoter, enhancer, intron and exon, coding sequence. FUNDAMENTAL MECHANISMS OF GENE EXPRESSION Regulation of gene expression in eukaryotes: genomic, transcriptional, post-transcriptional control (general concepts). Epigenetic modifications. a) Gene transcription: basic mechanism in prokaryotes and eukaryotes and required enzymatic apparatus (RNA polymerase). b) Transcription and maturation of transcripts in eukaryotes: capping, splicing, polyadenylation. Structure of mature messenger RNAs and their transport to the cytoplasm. c) Translation mechanism in eukaryotes and prokaryotes. Regulation of translation in eukaryotes. Non-coding RNAs and regulatory RNAs. Structure of ribosomes and transport RNA. The genetic code and the rules of translation. Co-translational and post-translational protein folding. Sorting of proteins to various cellular compartments in eukaryotes. THE CELL CYCLE AND ITS REGULATION: The different phases of the cell cycle and their meaning. Role of growth factors. Cellular differentiation concept. Stem cells. Control of the cell cycle. Cycle progression: cyclins and cyclin-dependent protein kinases. Cellular growth and proliferation factors. Cancer as an alteration of the control mechanisms of cell proliferation. Concept of proto-oncogenes, oncogenes, anti-oncogenes. Cell death mechanisms. Concept of autophagy (pro-survival and/or pro-death). Concepts on tumor progression and metastasis. Notes on cell study techniques.

Texts and readings	- E. Ginelli e M. Malcovati: - Molecole, Cellule e Organismi – EdiSES - Ultima ed. - BECKER: Il mondo della cellula (J Hardin, J.P. Lodolce) – Pearson ed. - ultima edizione - G. KARP – Biologia Cellulare e molecolare (J. Iwasa, W. Marshall) - EdiSES Ultima edizione - Alberts B, et al. – L'essenziale di Biologia molecolare della cellula – ultima edizione – Zanichelli - G. M. COOPER – La cellula (L. Amicone, R. Strippoli) – Piccin ed.
Notes, additional materials	Lesson material will be provided to students. Guide to reading scientific articles of particular interest regarding cell biology.
Repository	Teaching material is shared on the TEAMS platform

Assessment	
Assessment methods	The exam includes a written test which, if passed, at least with a passing grade, allows access to the oral test.
Assessment criteria	The written test has the objective of a general assessment of the entire cell biology program. The oral exam aim to verify the ability to argue and critically discuss the contents of the program, the acquisition of the specific terminology of the discipline, the expository and argumentative skills, the autonomy of judgement, the relevance of the answers with respect to the questions asked by the commission, the overall vision of the discipline and the ability to connect the different parts of the program.
Final exam and grading criteria	The exam will be evaluated according to the following criteria: Unsuitable: significant deficiencies and/or inaccuracy in knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations. 18-20: just sufficient knowledge and understanding of the topics with possible imperfections; sufficient capacity for analysis, synthesis, and autonomy of judgment. 21-23: Knowledge and comprehension of routine topics; Ability to analyse and synthesize correctly with coherent logical argumentation. 24-26: Fair knowledge and understanding of the topics; Good analytical and synthesis skills with rigorously expressed arguments. 27-29: Complete knowledge and understanding of the topics; remarkable analytical and synthesis skills. Good judgements. 30-30L: Excellent level of knowledge and understanding of the topics. Remarkable skills of analysis and synthesis and autonomy of judgment. Arguments expressed originally. The final grade of the integrated course will be established based on a weighted average of the grades reported in the individual courses.
Further information	----------

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

SCHEDA DI INSEGNAMENTO IN LINGUA INGLESE

COURSE: Medicine and Surgery

ACADEMIC YEAR: 2024-2025; I YEAR – I semester

ACADEMIC SUBJECT: Genetics (2cfu)

Integrated Course: Applied and Molecular Biology (9cfu)

AK Course

General information	
Year of the course	I YEAR – I semester
Academic calendar (starting and ending date)	I sem
Credits (CFU/ETCS):	Integrated Course: 9 CFU. Academic subject: 2 CFU
SSD	Experimental Biology – BIO/13
Language	Italian
Mode of attendance	Mandatory

Professor/ Lecturer	
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Department	Dept. of Precision and Regenerative Medicine and Ionian Area (DIMEPRE-J)
address	Nuova palazzina di Nefrologia e dialisi, Policlinico – piazza Giulio Cesare, 11 BARI
Virtual room	Teams: paola.pontrelli
Office Hours (and modalities: e.g., by appointment, on line, etc.)	Students will be welcomed on Tuesday (H 10-11) by previous appointment via e-mail

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
50	20	---	30
CFU/ETCS			
2	0,8	---	1,2

Learning Objectives	The teaching activity, in coherence with the declaration of the BIO/13 scientific board, has the objective of let students understand: - the organization of the genetic material in the cell and the processes of cell division; - the fundamental mechanisms of transmission of hereditary characteristics; - the balance between continuity and variability of genetic information in living organisms; - the methods of transmission of hereditary characteristics and the mechanisms that can give rise to normal and pathological phenotypic variants; - applications of general and molecular genetics relating to knowledge of the above processes
Course prerequisites	It is a first year, first semester course, for which there are no specific pre-requisites different from those required for the access to the degree course.

Teaching strategie	Lectures with the aid of Power Point, textbooks and teaching material provided by the teacher to the students.
Expected learning outcomes in terms of	The expected learning outcomes at the end of the course include the acquisition of appropriate language with appropriate and clear terminology.
Knowledge and understanding on:	The objective of the Genetics course is to lead students to understand: •The organization and structure of the genetic material •Mechanisms of genetic variability •The principles of Mendelian genetics, the segregation of sex-related traits and the mechanisms underlying the deviation from Mendelian genetics •The different classes of genic, genomic and chromosomal mutations •Genetics and mechanisms of regulation of gene expression in prokaryotes
Applying knowledge and understanding on:	The student should acquire knowledge of the main mechanisms of character's segregation, gene association and sex-linked inheritance. The student should know the mechanisms underlying characters' recombination and the effect of mutations on the genetic material. Students should be able to recognize the structure of eukaryotic and prokaryotic genomes.
Soft skills	• *Making informed judgments and choices* The student should be able to recognize the importance of in-depth knowledge of the fundamental topics for an adequate medical education of which knowledge of general genetic mechanisms represents an important component

	• *Communicating knowledge and understanding* The student should be able to present and explain the topics covered by the teaching, in a rigorous, organized and coherent manner, using appropriate scientific language. • *Capacities to continue learning* The student must be able to connect and integrate the knowledge learned with that provided in the other courses and apply it in the medical field.

Syllabus **Content knowledge:**	DNA and CHROMOSOMES: characteristics and structure. DNA REPLICATION. REPRODUCTION AND GENETIC VARIABILITY: Agamic and sexual reproduction. The duplication of genetic material. Mitosis. Meiosis and genetic variability. Segregation, assortment and recombination of chromosomes in meiosis. MENDELIAN GENETICS – Experiments and Mendel's laws. Chromosome theory of inheritance. Chromosomal sex determination. CHARACTERS RELATED TO SEX. ALLELIC INTERACTIONS: incomplete dominance, codominance, multiple alleles, lethal genes, pleiotropy. GENE INTERACTIONS: atypical Mendelian dihybrid relationships, epistasis. Penetrance and expressiveness. Genes and environment. Maternal effect. Complementation test. GENE ASSOCIATION: Linked genes. Recombination. Frequency of recombination. Gene maps. Interference. MUTATIONS: Genic, chromosomal (deletions, duplications, inversions and translocations) and genomic (aneuploidy and polyploidy) mutations. Spontaneous and induced mutations. Dynamic mutations, mutations in non-coding regions. DNA repair mechanisms. TRANSPOSABLE ELEMENTS IN PROKARYOTES AND EUKARYOTES: Transposition mechanisms GENETICS OF MICROORGANISMS: Transformation. Conjugation. Transduction. Gene mapping in bacteria and bacteriophages. REGULATION OF GENE EXPRESSION IN PROKARYOTS: the Lac operon, positive and negative control. Genes encoding for tryptophan and attenuation.

Texts and readings	•BENJAMIN A. PIERCE - Genetica - Zanichelli Ed. •GRIFFITHS A.J.F. et al. – Genetica – Principi di analisi Formale. Zanichelli Ed.- ultima ed. •P. J. RUSSELL - Genetica. Un approccio molecolare – Pearson-ultima Ed. •D. P. SNUSTAD - M. J. SIMMONS - Principi di Genetica. EdiSES Ultima ed.
Notes, additional materials	Lecture notes, slides provided by the teacher.
Repository	Teaching material shared on the TEAMS platform

Assessment	
Assessment methods	The exam includes a test during which the acquisition of the expected knowledge will be verified.
Assessment criteria	The student's ability to solve general genetics questions; clarity, completeness and correctness of oral presentation; achievement of specific knowledge and use of appropriate technical-scientific language; critical analysis and judgment skills
Final exam and grading criteria	Learning will be assessed based on the level of knowledge and understanding of the topics, ability to solve exercises and the ability to analyze, summarize and judgement. To achieve a high rating, the student should develop an excellent level of knowledge and independent judgment and adequate argumentation and presentation skills.
Further information	----------

COURSE OF STUDY

ACADEMIC YEAR: AA 2024-2025; II semester

ACADEMIC SUBJECT Molecular Biology (3 CFU/ETCS) C.I.

INTEGRATED COURSE: Applied and Molecular Biology (9 CFU/ETCS)

A-K Course

General information	
Year of the course	*I Anno*
Academic Calendar (starting and ending date)	*II semester*
Credits (CFU/ETCS):	*3 CFU*
SSD	*Molecular biology BIO/11*
Language	*Italian*
Mode of attendance	*mandatory*

Professor/ Lecturer	
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Virtual room	Piattaforma skype: Anggallo
Office Hours and Modalities:	Monday, 12-14, Nuovo complesso Scienze Biomediche, I piano, after contact by mail

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
75	*30*	*0*	*45*
CFU/ETCS			
3	*1,2*	*0*	*1,8*

Learning objectives	The main goal of this course is to provide medical students with an understanding of the molecular basis of modern medicine. It covers the fundamental knowledge of the molecular mechanisms that regulate and underlie

	the maintenance and flow of genetic information in prokaryotic and eukaryotic organisms, including humans. The course aims to provide information on the structural levels of nucleic acids and the molecular mechanisms of genome maintenance, transmission, and expression. Additionally, the course provides information on the main molecular biology techniques in the context of new biomolecular technologies and the genome project, which have the potential to revolutionize medicine.
Course prerequisites	Previous knowledge and skills in Chemistry and Biochemistry, Physics, General Biology, and basics of Mendelian genetics.

Teaching strategies	*The achievement of this knowledge will be supported and guaranteed by lectures in the classroom with the help of slides. It will be aided by textbooks as well as teaching material provided by the teacher to the students.*

Expected learning outcomes in **terms of:**	The expected learning outcomes at the end of the course include knowledge and understanding of the topics presented in class, the ability to analyze, synthesize and make judgments on topics and the acquisition of appropriate language with specialized and clear terminology. The specific learning outcomes of the programme are consistent with the general provisions of the Bologna Process and the specific provisions of Directive 2005/36/EC. They are located within the European Qualifications Framework (Dublin Descriptors) as follows:
Knowledge and understanding ***on:***	**1. Knowledge and understanding** Demonstrate a complete theoretical knowledge of the structure of the main molecules of biological interest and the main concepts of molecular biology. Identify and define the main information flow processes, with particular attention to DNA structure, replication, gene transcription, mutations and DNA repair systems and protein synthesis emphasizing the differences between prokaryotes and eukaryotes (humans). Understand the mechanisms of action of molecular biology investigation techniques, including the newest, and their fundamental usefulness in the medical field.
Applying knowledge and understanding on:	**2. Applied knowledge and understanding** Knowledge of the main consequences of genome alterations. Identify and recognize the specific molecular diagnostic techniques of some pathologies with DNA alterations. Recognize the potential of recombinant protein expression techniques in medicine. Apply theoretical knowledge to examples of human pathologies, being able to recognize the general diagnostic aspects of gene abnormalities and the usefulness of gene therapy and editing.
Soft skills	**Making informed judgments and choices** • Making judgements Recognize the importance of a thorough knowledge of the subjects by adequate medical education. • Identify the fundamental role of correct theoretical knowledge of the subject in the medical field. • Communication Present the topics orally in an organized and coherent way. Use of appropriate scientific language that is consistent with the topic of the discussion. **Capacities to continue learning** • Learning skills Recognize the possible applications of the skills acquired in the future medical career.

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

Syllabus	
Content knowledge	**Components of nucleic acids.** Nitrogenous Bases, Nucleosides and Nucleotides. Analogues of the bases. Double helix conformations (A, B and Z). Denaturation and renaturation. Physico-chemical properties. RNA conformations. **Genes and chromosomes.** Size of genomes. Genes and chromosomes. DNA supercoiling and topological properties. Topoisomerase. Bacterial nucleoid. Properties and assembly of histones and nucleosomes. Higher-order structure of chromatin. Post-translational modifications of histones. Bromodomines and chromodomains. Epigenetics. **Genome in prokaryotes and eukaryotes.** Model of the replication. DNA synthesis. Bacterial DNA polymerases. *Proofreading* and *Nick translation*. Replicon models. OriC and hemi-methylation. Ter/Tus. Replication factories in the eukaryotic nucleus. ARS structure and replication control. Enzymology. Pre-RC and pre-start complex. Replication inhibitors such as chemotherapeutics and antivirals. Structure, function and significance of telomeres and telomerase. **DNA damage and repair.** Genomes as dynamic entities. Somatic and germline mutations. SNP. Intrinsic and extrinsic damages. Chemical and physical mutagens. Removal, reversal and damage avoidance systems in prokaryotes and eukaryotes. MUT system. BER systems. Importance of glycosylases. Security systems. NER systems: UvrABCD and XP proteins. GG-NER and TC-NER. Photolyasis, MGMT, AlkBH. Damage tolerance mechanisms. TLS. SOS response in bacteria. Single and double filament breaks. HR and NHEJ. Human diseases due to mutations in the reparative systems. **Site-specific recombination.** Recombinases. Lambda phage. Cre-Lox system and KO mice. Simple and complex transposons. SINE and LINE elements, Alu sequences. **RNA in prokaryotes and eukaryotes.** Structure, types, and properties. Bacterial RNA polymerase and associated factors. Transcription unit. Steps of transcription. *Consensus* sequences in bacterial promoters. Termination mechanisms. Inhibitors. Lac, ara, and trp operons. Positive and negative control. RNA categories in eukaryotic cells. Structure and function of RNA polymerases, CTDs. Characteristics of the three promoters. Basal transcription machinery. TFIIH. Transactivators, coactivators. Methylation of the CpG islands. Histone code. Long-range regulators. Functional domains of DNA-binding proteins (HTH, HD, HLH, ZF, LZ). **RNA maturation, nuclear transport, and post-transcriptional control.** Types of capping. Adding polyA. Changes to the CTD. Exons and introns. Exon *shuffling*. Four classes of introns and removal mechanisms. Spliceosome and splicing sites. AT-AC splicing. EJC complexes. Alternative splicing. ESE and ESS sequences, SR and hnRNP proteins. SMN genes. Splicing and pathologies. rRNA and tRNA processing reactions. Ribosomal genes. SnoRNA and nucleolus functions. RNA editing. Insertion and conversion editing. Examples of RNA editing in humans. RNA turnover in the nucleus and cytoplasm. Exosome. *Nonsense-mediated mRNA decay* (NMD). Non-coding RNAs. Function of small RNAs in cells. RNA *interference*. siRNA. Biogenesis of microRNAs. Mechanism of action of miRNAs, *long noncoding* RNA, circRNA. General information about retroviruses. **Genetic code and translation.** Properties and characteristics of the genetic code. Mitochondrial code. ORF. Characteristics of tRNAs. Unusual bases. Function and classes of aa-tRNA-synthetases. Translational recoding and expansion of the genetic code. SeCys. The ribosome is a ribozyme. The stages of translation in prokaryotes and eukaryotes. Different starting mechanisms. Energy cost. NSMD. tmRNA in bacteria. Inhibitors. **Post-translational modifications, sorting and degradation of proteins.** Folding and misfolding. Prions. HSP60 and HSP70. Ubiquitin and ubiquitination systems. Sumoylation Glycosylation. Proteasome. The peptide signal. Protein sorting. Mitochondrial import. **Mitochondrial genome** Mitochondrial plasticity in the cell. The human mitochondrial genome. Principles of inheritance, structure, replication, and its expression. Alterations in mtDNA. **Principles of DNA cloning.** Modification-restriction systems. Cloning vectors. cDNA synthesis. Libraries of genomic DNA and cDNA. TA cloning. Expression cloning. Silencing of gene expression. Gene therapy. Databases. Genome editing elements (Talen, Zn finger, CRISPR/Cas9 systems). **PCR and DNA sequencing**. Characteristics of PCR. PCR-RFLP. Real-time PCR, DNA sequencing. NGS. **Hybridization of nucleic acids.** Principles of hybridization. Melting point and stringency. Probe preparation: Nick translation. Southern, Northern, Hybridization Assays. Western blot.

Texts and readings	BIOLOGIA MOLECOLARE – terza ed. F. Amaldi, P. Benedetti, G. Pesole, P. Plevani Ed. Ambrosiana FONDAMENTI di BIOLOGIA MOLECOLARE Lizabeth A. Allison Ed. Zanichelli 2023 BIOLOGIA MOLECOLARE del gene Watson, Baker et al., 2022 Ed. Zanichelli BIOLOGIA MOLECOLARE Craig, Cohen Fix, Green et al. Editore: Pearson
Notes, additional materials Repository	*Lecture notes and slides provided by the teacher*
Repository	*Teams class*

Assessment	
Assessment methods	Ability of the student to respond appropriately to open-ended questions on the topics covered by the lecture in oral form. *There are no differentiated assessment methods for attending and non-attending students.*
Assessment criteria	The oral exam aims to assess a) the achievement of the specific skills provided by the course; b) elaboration, critical analysis, and judgement skills; c) mastery of scientific language. The outcome of the test is evaluated based on the clarity, correctness, and completeness of the exposition of the proposed topics of discussion.
Final exam and grading criteria Further information	The exam will be evaluated according to the following criteria: Unsuitable: significant deficiencies and/or inaccuracy in knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations. 18-20: just sufficient knowledge and understanding of the topics with possible imperfections; sufficient capacity for analysis, synthesis, and autonomy of judgment. 21-23: Knowledge and comprehension of routine topics; Ability to analyse and synthesize correctly with coherent logical argumentation. 24-26: Fair knowledge and understanding of the topics; Good analytical and synthesis skills with rigorously expressed arguments. 27-29: Complete knowledge and understanding of the topics; remarkable analytical and synthesis skills. Good judgements. 30-30L: Excellent level of knowledge and understanding of the topics. Remarkable skills of analysis and synthesis and autonomy of judgment. Arguments expressed originally.
Further information	----