UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Biologia e Genetica II

2627-1-H4602D006

Aims

The course aims to provide students with an in-depth understanding of the connections between cell biology, molecular biology, and genetics within the biomedical sciences. The objective is to consolidate advanced knowledge and foster an integrated view of the molecular mechanisms underlying genetic diseases.
Knowledge and Understanding

Students will gain knowledge about:
• The interplay between cell biology, molecular biology, and genetics in biomedical contexts.
• Molecular mechanisms responsible for Mendelian and complex diseases.
• Genetic diagnostic techniques, including advanced analytical technologies and innovative therapeutic approaches.

Applying Knowledge and Understanding
The course provides a foundation to understand how alterations in regulatory molecular mechanisms can affect the pathophysiological processes of hereditary disorders.

Independent Judgment
Students will develop the ability to critically evaluate the role of molecular processes in determining phenotypes and the onset of genetic diseases.

Communication Skills
Students will learn to describe key concepts using appropriate scientific and technical language, including the interpretation of images and scientific texts.

Learning Skills
Understanding will be reinforced through the discussion of selected scientific papers, promoting the acquisition of critical and up-to-date competencies.

Contents

The course explores the pathological implications of genomic and cellular alterations, illustrating key molecular biology techniques relevant to diagnosis and therapy.

Detailed program

• Examples of Mendelian diseases (autosomal, X- and Y-linked, mitochondrial, and multifactorial inheritance)
• Immunogenetics and antibody diversity
• Cancer genetics
• Diagnostic strategies for genetic diseases (direct and indirect analysis)
• Gene therapy for monogenic diseases: approaches and case studies,
• Stem cells, cell therapy, and regenerative medicine

Prerequisites

As defined by the Degree Programme regulations.

Teaching form

20 total hours of teaching, divided into:
• Lecture-based teaching: 16 hours for theoretical content
• Interactive teaching: 4 hours for exercises, case discussions, and applied learning
All activities are conducted in person.

Textbook and teaching resource

Recommended textbook:
• G. De Leo, E. Ginelli, S. Fasano. Biologia e Genetica, EdiSES, 2020
• H. Lodish et al., Molecular Cell Biology, 9th ed., Freeman, 2021
• G. Karp, Cell and Molecular Biology, 3rd ed., EdiSES, 2021
• T. Strachan, Human Molecular Genetics, Zanichelli, 2021
• P. J. Russell, Genetics – A Conceptual Approach, 2nd ed., EdiSES, 2016
• B. A. Pierce, Genetics, 2nd ed., Zanichelli, 2016

• Lecture slides provided by the instructor

Semester

Second semester

Assessment method

Written exam (duration: 1 hour)
• 15–20 multiple choice questions
• 1 open-ended question on any topic covered in the course, aimed at assessing comprehensive preparation

Office hours

By appointment via email

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY