	Email: stefania.vetrano@humanitasresearch.it; stefania.vetrano@hunimed.eu
Objectives	Provide basic knowledge of the structure of the eukaryotic cell, in its fundamental structural components, necessary for the life cycle, to oversee macromolecular synthesis, and to interact with the external environment. The module provides an overview of the mechanisms of transmission of genetic information and an overview on genetic diseases.
Teaching methods	The course will be conducted through lectures (face-to face and online).
Teaching material	Lecture slides Solomon, Berg, Martin. Elementi di biologia cellulare. Edises (VI edizione) 2013. Zoppi, Colombi. Biologia e Genetica del Muscolo. Edises 2012.

Content

1) Eukaryotic cell

Components and structural and functional organisation of the eukaryotic cell, the lipid bilayer, membrane proteins, membrane transport, intracellular compartments, the nucleus - endoplasmic reticulum - Golgi apparatus - mitochondria - lysosomes - peroxisomes - ribosomes.

Comparison of different cell types such as epithelial, muscle, nerve and blood cells.

2) The cytoskeleton

Functions and reticular organisation - Actin filaments - Microtubules - Intermediate filaments

3) **Cellular communication systems**

The cell-cell junctions - The cell-extracellular matrix junctions - Messengers - Vesicular transport - Endocytosis and Exocytosis

5) Structural organisation and replication of DNA

DNA as the repository of genetic information - the central dogma of molecular biology - structural organisation of DNA - replication mechanism and function of the proteins involved in DNA repair

6) Transcription, translation and regulation of gene expression

The process of transcription, mRNA maturation, genetic code. Mechanism of translation. Main mechanisms of regulation of gene expression.

7) Cell cycle

The phases of the cell cycle - Mitosis - Control mechanisms of the cell cycle - Meiosis

8) Elements of Genetics

Karyotype - Chromosome abnormalities - Point mutations - Mendelian inheritance of genes - General characteristics of sex-linked hereditary diseases - Genetic diseases of muscles

MICROBIOLOGY (1 ECTS)

Dr Marta Monari	Specialised in Microbiology and Virology, Master II level in Molecular Virology, she works as Head of the Clinical Analysis Laboratory at the Istituto Clinico Humanitas. Email: marta_noemi.monari@humanitas.it
Objectives	Provide essential knowledge of microbiology and virology with a focus on healthcare related infections and a special focus on nosocomial infections and their

understanding of vaccination programmes and their impact on health and reducing the number of cases.

Examination for the Biological Sciences course

The examination will be a multiple-choice test delivered via the LMS platform with LockDown browser on or off campus.

There are 3 sections (one for each module) structured as follows:

- Biochemistry: 20 questions; time available 20 minutes; 1.5 points per question; pass mark: 18 points.
- Biology: 10 questions, time available 10 minutes, 3 points per question, pass mark: 18 points.
- Microbiology: 10 questions, time available 10 minutes; 3 points per question, pass mark: 18 points.

Multiple-choice questions will have 4 answer options, only one of which will be correct. 0 points will be awarded for incorrect answers or unanswered questions.

For each module there will be a final mark over 30, after which a weighted average will be made according to the ECTS.

In order to pass the examination the student must achieve a pass mark in each module. However, if he/she only achieves a pass mark in 2 out of 3 modules, it is at the discretion of the lecturers to decide whether to repeat the exam for the failed module at the next exam session.

Honours are obtained with a mark of 30/30 in each module.