



## MODELLO SCHEDA INSEGNAMENTO

Corso di L/LM/LMCU	BIOTECNOLOGIE
Denominazione insegnamento:	BIOLOGIA CELLULARE
Numero di Crediti:	9
Anno	I
Semestre:	I
Docente Titolare:	AMBROSINO CONCETTA
Dottorandi/assegnisti di ricerca che svolgono attività didattica a supporto del corso:	DANILA CUOMO
Orario di ricevimento:	14-16, MARTEDI'
Indirizzo:	VIA PORT'ARSA 11

### PRESENTAZIONE DEL CORSO:

The course aims to illustrate the structural and functional complexity of the cells how the activity of the different cellular components is integrated. Starting from a quick description of the structure-function relationship of the biological macromolecules and the organelles, the course describes the dynamic activity of the main cellular organelles and the relationship between them. Overall, the course will provide the knowledge necessary to understand the different cellular activities in physiological condition whose acquisition is necessary for the study of the pathologies associated with their alteration.

### GLI OBIETTIVI FORMATIVI

The main goal of the course is to offer the student the ability to build a conceptual and realistic framework of the cell needed to critically evaluate the new scientific concepts and, above all, to understand them.

Aim 1: Acquiring basic knowledge on the structure-function relationship of macromolecules, organelles, etc., which governs all cellular phenomena and which underlies the mechanisms that regulate cellular functionality.

Aim 2: Acquisition of knowledge of the relevant methods, instrumentation and basic and avant-garde procedures used for experimentation in the field. These knowledge are directly correlated with a greater understanding of the social organization of cells within the tissues in which they reside, the modalities of cell-cell communication and cell-microenvironment. Particular attention will be paid to

underline how the relationship between cells and with factors of its micro-environment is essential for a correct function of the cell itself, of the tissue and of the overall homeostatic control of the body;

Aim 3: To equip students with the knowledge tools needed to understand the main current biological problems and the modern methods.

### **PREREQUISITI RICHIESTI**

Basic knowledge of physics and chemistry.

### **FREQUENZA DELLE LEZIONI**

Although not obligatory, it is advisable to attend the course in order to be routed in the study of a vast and heterogeneous matter. The course is structured to guide the student through different topics by placing them in the cellular context, emphasizing the modalities of their integration. The laboratory exercise will give an idea of the basic instrumentation and the main techniques used in cell biology, or the possibility of access to tests or exam simulations.

### **CONTENUTI DEL CORSO**

- Biological macromolecules: Structure and their synthesis in cells;
- Organization of biological membranes and general aspects of the structure and function of the main cellular compartments: plasma membrane and transport through it (Genesis and maintenance of electrochemical gradients), mitochondria, nucleus and reticulum reticulum (quality control of proteins and ubiquitination);
- Protein sorting in the different cell compartments: membrane protein insertion, nucleus-cytoplasm transport, transport in the mitochondria, transport in the ER, vesicular traffic (vesicle formation, etc);
- Organization, function and dynamism of the cytoskeleton;
- Signalling between cells and non-pathological signal transduction with identification of the main signal transduction pathways;
- Cell division: Mechanisms of regulation and control of the cell cycle with particular attention to mitosis and the dynamics of the separation of genetic material.

### **METODI DIDATTICI**

The course will be carried out by integrating the frontal lessons with laboratory exercises in order to make evident the morpho-functional relationships between different organelles. In order to guide the student in the study will be carried out two inter-course tests:

I intercourse test, 3rd week of November (I-Mo semester),

II intercourse test, 3rd week of December (I-Mo semester).

### **TESTI DI RIFERIMENTO**

**Alberts - Biologia Molecolare della Cellula VI edizione - Zanichelli**

## ESAME DI PROFITTO

The final exam will consist of an oral test. The test will be evaluated up to the quality of the content and the relevance of the answers. Particular attention will be paid to the ability to link the different topics and to the language property of the student

## CALENDARIO ESAMI

Go to the link

## PRENOTAZIONE ESAMI

Go to the link

## SYLLABUS

Argomenti	Ore	Riferimenti bibliografici	Tipologia di lezione
The cells. General aspects of cell chemistry and bioenergy. Biological macromolecules.	12	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson
DNA, chromosomes and DNA replication. Transcription and post-transcriptional control. Translation	16	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson and laboratory
Plasma membrane and membrane transport	16	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson and laboratory
The cell compartmentalization. ER and post-and co-translational transport. Protein modifications, quality control: ubiquitination and degradation. Vesicular transport	16	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson and laboratory
Cytoskeleton and cell movement. Cell junction	12	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson and laboratory
Signal trasduction	12	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson and laboratory
Cell cycle and mitosis Meiosis	12	<b>Alberts - Biologia Molecolare della Cellula VI edizione</b>	Frontal lesson and laboratory