
COURSE: General Biology

ACADEMIC YEAR: 2019-2020

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Vittoria Infantino

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phone: 0971/206102

mobile (optional):

Language: Italian

ECTS: (lessons e
tutorials/practice) 7n. of hours: **60 (48 lessons
and 12 tutorials/practice)**Campus: **Potenza**
Dept./School: **Dipartimento di
Scienze**
Program: BiotechnologySemester: I
(from 1 October 2019
to 20 December 2019/
20 January 2020)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main knowledge provided will be:

- structure and function of prokaryotic and eukaryotic cells
- main mechanisms of the cell genetic transmission
- molecular mechanisms regulating cellular activities
 - methods to observe and study different cells

Students will be able to :

- recognize and describe prokaryotic and eukaryotic cells
 - describe main mechanisms of the cell genetic transmission
 - observe cell and tissue samples by light microscope
 - recognize the relationship between structure and function at all levels: molecular, cellular organelle and cellular
 - trace the flow of matter and energy through the cells
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PRE-REQUIREMENTSnothing

SYLLABUS**Unit 1: Introduction to the Cell Biology**

(10 hours Theoretical lessons)

Topics:

Introduction to the biology

Biological molecules. Energy in living organisms

Autotrophic and heterotrophic metabolism. Anaerobic and aerobic metabolism

Cell structure and function. Homeostasis

The origin and evolution of life on earth

Unit 2: Structure and functions of prokaryotic and eukaryotic cells

(30hours Theoretical lessons + 8 hours Laboratory tutorials)

Topics:

Prokaryotes: main characters

Eukaryote domain. Eukaryote cell. Cellular organization levels.

Differences between animal and plant cell.

Cell membranes – osmosis – passive and active transport

Cytoskeleton

Endoplasmic reticulum. Golgi apparatus, lysosomes, glyoxysomes and peroxisomes, autophagy.

Mitochondria and Chloroplasts: Structure and function. Endosymbiotic theory. Cell respiration and energy conversion. Photosynthesis,

Genome and inheritance. Additional functions.
Nucleus: chromosome structure. Gene. DNA duplication, transcription.
Ribosomes and protein synthesis. Genetic code.
Cell junctions
Extracellular matrix and animal tissues.
Cell signaling
Cell cycle: Mitosis
Apoptosis
Asexual and sexual reproduction. Meiosis
Development and cell differentiation – Stem cells

Unit 3: Methods

(8hours Theoretical lessons + 4 hours Laboratory tutorials)

Topics:

Cell lysis and fractionation
Light microscopy.
Fluorescence microscopy, Electron microscopy, Flow Cytometry.
Cell Culture of animal and plant cells. Biotechnology application.

TEACHING METHODS

Theoretical lessons (48 hours) Laboratory tutorials (12 hours)

EVALUATION METHODS

Oral examination,
Report (laboratory activity)

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- *Alberts B. " L'essenziale di biologia molecolare della cellula". Edizione Zanichelli.*
- *Becker W.M. "Mondo della cellula". Edizione Pearson*
- *Slides: (<http://www2.unibas.it/infantino/index.php/biotec/lezioni-di-biotecnologia>)*

INTERACTION WITH STUDENTS

Office hours: Monday and Tuesday 9:00-11:00 am

Please let me know in advance by email (vittoria.infantino@unibas.it) if you plan to come

EXAMINATION SESSIONS (FORECAST)¹

06/02/2020
4/03/2020
16/06/2020
14/07/2020
18/09/2020
12/10/2020
01/12/2020

SEMINARS BY EXTERNAL EXPERTS YES X NO

FURTHER INFORMATION

¹Subject to possible changes: check the web site of the Teacher or the Department/School for updates.