

BIOLOGY

| MODULE | CONTENT | YEAR | TERM | CREDITS | TYPE |
|--|---------|------|--|---------|------------|
| Basic Sciences | Biology | 1 | 1 | 6 | Obligatory |
| PROFESSOR(S) | | | TUTORING CONTACT INFORMATION (Address, phone number, email, etc) | | |
| <ul style="list-style-type: none"> • Luis Miguel de Pablos Torr : Parte I “Temas 1-12” • Noel A. Tejera Garc a: Parte II “Temas 13-24” | | | <ul style="list-style-type: none"> • Prof. Luis Miguel de Pablos Torr . Departamento de Parasitolog a. Facultad de Farmacia. lpablos@ugr.es • Prof. Noel A. Tejera Garc a. Departamento de Fisiolog a Vegetal, Facultad de Farmacia. Planta -1, Despacho n  13. natejera@ugr.es | | |
| | | | TUTORING HOURS | | |
| | | | <ul style="list-style-type: none"> • Mon. & Wed. from 9:30 to 12:30 h (Prof. Tejera) • Thu. & Fri. from 9:30 to 12:30 h (Prof. de Pablos) | | |
| DEGREE IN WHICH THE SUBJECT IS TAUGHT | | | OTHER DEGREES IN WHICH THE SUBJECT IS TAUGHT | | |
| Degree in Science and Food Technology | | | Degree in Pharmacy and Human Nutrition and Dietetics | | |
| PREREQUISITES AND RECOMENDATIONS (IF THEY APPLY) | | | | | |
| <p>Have an adequate knowledge of English language It is recommended that students have completed the subjects of Biology, Chemistry and Physics during secondary school.</p> | | | | | |
| BRIEF DESCRIPTION OF CONTENT (ACCORDING TO MEMORY OF DEGREE VERIFICATION) | | | | | |
| <ul style="list-style-type: none"> • The cell as structural and functional unit of living organisms. Cell cycle. • The prokaryotic and eukaryotic cell. Cell organelles, structure, organization and cellular physiology. • Cell wall and peculiarities of the plant cell. • Reproduction and development of living things. Cell cycle. Mitosis and meiosis. • Introduction to Genetics. • Organization of plant multicellular and main functions of plants. | | | | | |



- Fertilization, embryogenesis and development of seeds and fruits.
- Application of plant tissue cultures in the food industry

GENERAL AND SPECIFIC SKILLS

- **CB2.** Application of their student knowledge to their work or vocation in a professional manner and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study.
- **CB3.** Students should have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical.
- **CB4.** Ability of communicate information, ideas, problems and solutions to both specialist and non-specialist.
- **CB5.** Students should have developed those learning skills necessary to undertake further study with a high degree of autonomy.
- **CT.2.** Know and improve the user level in the field of ICT.
- **CG.06.** Ethical commitment.
- **CG.08.** Critical Thinking.
- **CG.10.** Capacity for organization and planning.
- **CG.11.** Ability to manage information.
- **CG.13.** Sensitivity to environmental issues.
- **CG.01.** Ability to express oneself correctly in Spanish language in their disciplinary field.
- **CG.02.** Troubleshooting.
- **CG.03.** Teamwork.
- **CG.04.** Ability to apply theoretical knowledge to practice.
- **CE1.** Recognize and apply the fundamentals physical, chemical, biochemical, biological, physiological, mathematical and statistical necessary for understanding and development of science and food technology.

OBJECTIVES (EXPRESSED AS A TEACHING RESULT)

- Understand the biological diversity could be exploited in food processing.
- To understand the fundamental structures and compartments of the cell.
- Identify the differences between the various types of eukaryotic cells in terms of their structure and physiology.
- To be able to describe the principles of transmission of genes and their consequences
- To know the characteristics of nuclear and mitochondrial inheritance.
- Be able to apply basic knowledge of multicellular organisms to the Science and Food Technology.
- Knowing how plants and applications of plant tissue cultures in the food industry.
- To know search and use Biology bibliographic information.

DETAILED SYLLABUS OF THE SUBJECT

- Item 1.- General characteristics of living organisms. Levels of organization. The biological classification. (1 hour)
- Item 2.- Prokaryotic and eukaryotic cells: differences. Prokaryotic cell model. (2 hours)
- Item 3.- Eukaryotic cell. Organization. Plasma membrane: Structure. Chemical composition. Molecular architecture. Physiological roles of the membrane. Transport of substances. (2 hours)
- Item 4.- Specializations of the cell surface. Microvilli and invaginations. Junctional complexes. (1.5 hours)



- Item 5.- Cytosol. Chemical composition. Importance as a reserve of materials. Metabolic pathways. (1 hour)
- Item 6.- Cytoskeleton. Microtubules. Intermediate filaments. Actin filaments. Physiological roles of these structures. Cilia and flagella. (1.5 hours)
- Item 7.- Smooth and rough endoplasmic reticulum. Ribosomes and polysomes. Physiological roles. (1.5 hours)
- Item 8.- Golgi apparatus. Structure. Chemical composition. Physiological roles. (1.5 hours)
- Item 9.- Lysosomes. Structure. Chemical composition. Physiological role. Peroxisomes and other organelles: structure and function. (1 hour)
- Item 10.- Mitochondria. Structure. Chemical composition. Physiological roles. (1.5 hours)
- Item 11.- Transmission of signals between cells: cell communication. (1 hour)
- Item 12.- The Nucleus. Structure. Chemical composition. Nuclear envelope. Chromatin and chromosomes. Molecular constituents. Transmission and expression of genetic information. Nucleolus. (2 hours)
- Item 13.- Plant cell characteristics: Cell wall. Structure. Chemical composition. Physiological roles. (1 hour)
- Item 14.- Chloroplast: Structure. Chemical composition. Physiological roles. (1.5 hours)
- Item 15.- Cell Division I: Cell Cycle. Mitosis. (1.5 hours)
- Item 16.- Cell Division II: Meiosis. Types of asexual and sexual reproduction. (1 hour)
- Item 17.- Introduction to Genetics. Mendel's laws. Genes and chromosomes. Karyotype. Genotype and phenotype. Family tree. Human genome. (2 hours)
- Item 18.- Incomplete dominance. Codominance. Multiple alleles. (1 hour)
- Item 19.- Sex-linked inheritance. (1 hour)
- Item 20.- Growth and plant development. (1 hour)
- Item 21.- Fertilization, embryogenesis and development of seeds and fruits. (1.5 hours)
- Item 22.- Plant nutrition and food technology. (1.5 hours)
- Item 23.- Plant hormones and food technology. (1 hour)
- Item 24.- Cultivation of plant cells and tissues. Applications in the food industry. (1 hour)

Practice:

Seminars

-Problems of Genetics

Laboratory Practice:

Practice 1. Observation of animal and plant cells. Observation of organelles.

Practice 2. Mitosis.

Practice 3. Determination of nitrate in plant samples.

Practice 4. Plant tissue culture.

BIBLIOGRAPHY

BASIC BIBLIOGRAPHY

- ALBERTS, B., JOHNSON, A., LEWIS, J. RAFF, M. ROBERTS, K. Y WALTER, P. (2004). *Biología Molecular de la Célula*. (4ª ed) Ed. Omega Barcelona.
- ALBERTS, B., BRAY, D., JOHNSON, A. (2006). *Introducción a la Biología Celular*. (2ª ed.). Editorial Médica Panamericana. Madrid.
- HARVEY L (2010). *Biología Celular y Molecular*. (5ª ed.). Editorial Médica Panamericana. Buenos Aires.
- KARP, G. (2009). *Biología Celular y Molecular : Conceptos y experimentos*. (5ª ed). McGraw-Hill, México.



COMPLEMENTARY BIBLIOGRAPHY

- ABBAS, A. K., LICHTMAN, A. H., PILLAI, S. (2008). Inmunología Celular y Molecular. (6ª ed.) Elsevier. Barcelona
- BROOKER, R. J., (2009). "Genetics Analysis and Principles ", Boston. Mcgraw-Hill, Higher education cop.
- GRIFFITHS, A y COAUT, J. F. (2008). Genética. (9ª ed.). McGraw-Hill.
- KLUG, W. S., CUMMINGS, M. R., SPENCER, C. A. (2008). Conceptos de Genética. (8ª Ed.) Benjamin-Cummings Pub Co.
- KÜHNEL, W. (1997) Atlas de Citología e Histología. Editorial Médica Panamericana
- PANIAGUA GÓMEZ ALVAREZ, R. (2002). Citología e Histología vegetal y animal: Biología de las células y tejidos animales y vegetales. McGraw-Hill.
- ROITT, I. M., DELVES, P. J. (2008). Inmunología: Fundamentos. (11ª ed) Editorial Médica Panamericana. Buenos Aires
- STRACHAN, T.; READ, A.P. (2004). Genética Humana. (3ª ed.) Mc Graw Hill.
- VISERAS ALARCÓN, E. (2008). Cuestiones y problemas resueltos de Genética. Universidad de Granada.

RECOMENDED LINKS

- Virtual classroom of Genetics (<http://www.ucm.es/info/genetica/AVG/index.htm>)
- Classic articles of Genetics (<http://www.esp.org>)
- The Biology Project (<http://www.biology.arizona.edu>)
- Omin-online Mendelian inheritance in man (<http://www.ncbi.nlm.nih.gov>)
- Hypertext of Biology (<http://www.biologia.edu.ar/>)

