

MODULE	CONTENT	YEAR	TERM	CREDITS	TYPE
Basic Sciences	Biology	1	1	6	Obligatory
<b>LECTURER(S)</b>			<b>Postal address, telephone nº, e-mail address</b>		
<ul style="list-style-type: none"> <li>Clotilde Marín Sánchez: Part I (Items 1-12)</li> <li>Noel A. Tejera García: Part II (Items 13-24)</li> </ul>			<ul style="list-style-type: none"> <li>Clotilde Marín Sánchez. Dept. of Parasitology. Edificio Mecenas. School of Sciences. <a href="mailto:cmaris@ugr.es">cmaris@ugr.es</a></li> <li>Prof. Noel A. Tejera García. Dept. of Plant Physiology, School of Pharmacy. Level -1, Room #13. <a href="mailto:natejera@ugr.es">natejera@ugr.es</a></li> </ul>		
			<b>TUTORING HOURS</b>		
			<ul style="list-style-type: none"> <li>Tue &amp; Thu 10:30 to 13:30 horas (Prof. Tejera).</li> <li>Tue &amp; Thu 10:30 to 13:30 horas (Prof. Marín).</li> </ul>		
<b>DEGREE IN WHICH THE SUBJECT IS TAUGHT</b>			<b>OTHER DEGREES IN WHICH THE SUBJECT IS TAUGHT</b>		
Degree in Science and Food Technology			Degree in Pharmacy and Human Nutrition and Dietetics		
<b>PREREQUISITES AND RECOMENDATIONS (IF THEY APPLY)</b>					
<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>					
<b>BRIEF DESCRIPTION OF CONTENT (ACCORDING TO MEMORY OF DEGREE VERIFICATION)</b>					
<ul style="list-style-type: none"> <li>The cell as structural and functional unit of living organisms. Cell cycle.</li> <li>The prokaryotic and eukaryotic cell. Cell organelles, structure, organization and cellular physiology.</li> <li>Cell wall and peculiarities of the plant cell.</li> <li>Reproduction and development of living things. Cell cycle. Mitosis and meiosis.</li> <li>Introduction to Genetics.</li> <li>Organization of plant multicellular and main functions of plants.</li> <li>Fertilization, embryogenesis and development of seeds and fruits.</li> <li>Application of plant tissue cultures in the food industry</li> </ul>					



## 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. 81 hour)
- 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/>)

