

MODULE	SUBJECT MATTER	YEAR	SEMESTER	CREDITS	TYPE
Basic Sciences	Biology	1	1	6	Required
TEACHING STAFF ⁽¹⁾			ADDRESS, TELEPHONE NUMBER, EMAIL, ETC. -Dept. of Parasitology, 4th floor, Faculty of Pharmacy. -Dept. of Plant Physiology, Faculty of Pharmacy. Office number 13. E-mail: natejera@ugr.es		
<ul style="list-style-type: none"> • Assistant professor: Part I "Topics 1-12" • Noel A. Tejera García: Part II "Topics 13-24" 			TIMETABLE FOR TUTORIALS OR LINK TO WEBSITE <ul style="list-style-type: none"> • Prof. Martínez de la Puente: Mon, Wed, Fri, 9:30-11:30 h. • Prof. Tejera García: Mon, 9:00-13:00, Wed, 10:00-12:00 h 		
BELONGS TO UNDERGRADUATE DEGREE PROGRAMME			AND ALSO TO OTHER UNDERGRADUATE DEGREE PROGRAMMES		
<i>Grado</i> in Science and Food Technology			<i>Grado</i> in Pharmacy and Human and Dietary Nutrition		
PREREQUISITES OR RECOMMENDATIONS (where applicable)					
Have an adequate knowledge of the English language. It is desirable that the student has studied the subjects of Biology, Chemistry and Physics during high school					
BRIEF DESCRIPTION OF CONTENT (ACCORDING TO OFFICIAL VALIDATION REPORT)					
<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. 					

¹ Consult any updates in Acceso Identificado > Aplicaciones > Ordenación Docente

(∞) This course guide should be filled in according to UGR regulations on assessment of student learning: ([http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/!](http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/))



- 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 COMPETENCES

- **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 EXPECTED LEARNING OUTCOMES)

- 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

THEORY:

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



- Topic 4.- Specializations of the cell surface. Microvilli and invaginations. Junctional complexes. (1.5 hours)
- Topic 5.- Cytosol. Chemical composition. Importance as a reserve of materials. Metabolic pathways. (1 hour)
- Topic 6.- Cytoskeleton. Microtubules. Intermediate filaments. Actin filaments. Physiological roles of these structures. Cilia and flagella. (1.5 hours)
- Topic 7.- Smooth and rough endoplasmic reticulum. Ribosomes and polysomes. Physiological roles. (1.5 hours)
- Topic 8.- Golgi apparatus. Structure. Chemical composition. Physiological roles. (1.5 hours)
- Topic 9.- Lysosomes. Structure. Chemical composition. Physiological role. Peroxisomes and other organelles: structure and function. (1 hour)
- Topic 10.- Mitochondria. Structure. Chemical composition. Physiological roles. (1.5 hours)
- Topic 11.- Transmission of signals between cells: cell communication. (1 hour)
- Topic 12.- The Nucleus. Structure. Chemical composition. Nuclear envelope. Chromatin and chromosomes. Molecular constituents. Transmission and expression of genetic information. Nucleolus. (2 hours)
- Topic 13.- Plant cell characteristics: Cell wall. Structure. Chemical composition. Physiological roles. (1 hour)
- Topic 14.- Chloroplast: Structure. Chemical composition. Physiological roles. (1.5 hours)
- Topic 15.- Cell Division I: Cell Cycle. Mitosis. (1.5 hours)
- Topic 16.- Cell Division II: Meiosis. Types of asexual and sexual reproduction. (1 hour)
- Topic 17.- Introduction to Genetics. Mendel's laws. Genes and chromosomes. Karyotype. Genotype and phenotype. Family tree. Human genome. (2 hours)
- Topic 18.- Incomplete dominance. Codominance. Multiple alleles. (1 hour)
- Topic 19.- Sex-linked inheritance. (1 hour)
- Topic 20.- Growth and plant development. (1 hour)
- Topic 21.- Fertilization, embryogenesis and development of seeds and fruits. (1.5 hours)
- Topic 22.- Plant nutrition and food technology. (1.5 hours)
- Topic 23.- Plant hormones and food technology. (1 hour)
- Topic 24.- Cultivation of plant cells and tissues. Applications in the food industry. (1 hour)

PRACTICE:

Seminars

- Problems of Genetics

Laboratory work

- Session 1. Observation of animal and plant cells. Observation of organelles.
- Session 2. Mitosis.
- Session 3. Determination of nitrate in plant samples.
- Session 4. Plant tissue culture.

BIBLIOGRAPHY

BASIC READING LIST

- 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 READING

- 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.

RECOMMENDED 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>)

