

**COURSE DATA****Data Subject**

<b>Code</b>	33045
<b>Name</b>	Cellular and tissue biology
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	5.0
<b>Academic year</b>	2021 - 2022

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1100 - Degree in Biology	Faculty of Biological Sciences	2	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1100 - Degree in Biology	19 - Cell biology	Obligatory

**Coordination**

<b>Name</b>	<b>Department</b>
PONSODA I MARTI, XAVIER JOSEP	21 - Cellular Biology and Parasitology

**SUMMARY**

The Cell and Tissue Biology course has a close connection with another subject, Cell Structure, in which students study the cell as the structural and functional unit of living matter. In this new course, students study the higher organizational levels: the cell clusters that conform the animal and plant tissues and the groups of tissues that constitute the organs. The study is undertaken from a functional morphological perspective.

**PREVIOUS KNOWLEDGE****Relationship to other subjects of the same degree**

There are no specified enrollment restrictions with other subjects of the curriculum.



## Other requirements

## COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

### 1100 - Degree in Biology

- Skills in analysis and synthesis.
- Capacidad de obtención, organización, planificación y gestión de la información.
- Utilización del vocabulario de la materia.
- Habilidad para el trabajo en equipo.
- Capacidad de construir un texto escrito comprensible y organizado.
- Capacidad para realizar una exposición oral de forma clara y coherente.
- Conocer la estructura y función de los tejidos y órganos animales y vegetales.
- Conocer las técnicas histológicas para microscopía óptica y electrónica.
- Conocer las nociones fundamentales de biología del desarrollo.
- Capacidad de plantear y resolver problemas experimentales en Biología Celular y Tisular.

## LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

Identify and diagnose histological preparations

- Interpret electron microscopy images
- To identify the cell types of animals and plants
- Identify the tissues of animals and plants
- Identify the stage of cell cycle from histological preparations
- Design experiments on the formation and maintenance of tissues and interpret their results

## DESCRIPTION OF CONTENTS

### 1. Plant Histology: Meristems and mature tissues.

Primary and secondary meristems. Coating tissues: epidermis and periderm. Parenchyma, collenchyma and sclerenchyma. Secretory tissues. Conducting tissues: xylem and phloem.

### 2. Animal Histology: Epithelial tissue

Epithelial tissue. The epithelial cell. Basal lamina. Coating epithelia and glandular epithelia.



### **3. Animal Histology: Connective tissue**

Connective tissue. Mesenchyme. Components of connective tissue cells and extracellular matrix. Fat.

### **4. Animal Histology: Skeletal tissues**

Skeletal tissues. Notochord. Cartilage. Cellular components and cartilage matrix. Histogenesis cartilage. Types of cartilage. Bone tissue: bone matrix and cell components. The osteon. Histogenesis, growth and remodeling of bone.

### **5. Animal Histology: Blood and lymph**

Blood and lymph. Cell types. Hematopoiesis. Hematopoietic tissues and organs.

### **6. Animal Histology: Lymphocytes and Immune System**

Lymphocytes and immune system. Lymphoid organs.

### **7. Animal Histology: Muscle tissue**

Muscle tissue. Histogenesis. Skeletal muscle. Structure of the sarcomere. Motor unit: neuromuscular junction. Cardiac muscle. Smooth muscle.

### **8. Animal Histology: Nervous Tissue**

Nervous Tissue. Histogenesis. Structure of neurons: soma, dendrites and axon. Synapses. Glial cells: astrocytes, oligodendrocytes, Schwann cells and microglia.

### **9. Practical classes**

Plant tissues observation.

Simple epithelia. Stratified epithelia. Epidermis and its appendages. Connective tissue. Adipose tissue. Muscular tissue. Skeletal tissues: cartilage and bone.

Blood. Hematopoietic and lymphoid organs.

Nervous Tissue. Observation of neurons and glial cells.

The excretory system: the kidney and the urinary passages. The respiratory system: Trachea, lung. Endocrine organs.

Digestive tube and glands.

Male reproductive system and female reproductive system. Testes and ovaries. Sense organs.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	27,00	100
Laboratory practices	20,00	100
Tutorials	3,00	100
Development of group work	5,00	0
Preparation of evaluation activities	25,00	0
Preparing lectures	25,00	0
Preparation of practical classes and problem	20,00	0
<b>TOTAL</b>	<b>125,00</b>	

**TEACHING METHODOLOGY**

The acquisition of knowledge by the student, will be based on four pillars:

**1. Theory classes**

For about an hour, the teacher transmits knowledge to students of the subject with the support of appropriate teaching materials for each topic. In addition, promotion of the involvement of students through questions or issues that arise debate.

Virtual Classroom will be used to provide students with all learning materials.

**2. Practical classes**

In laboratory sessions of two hours, the student will analyze different preparations and photographs of light and electron microscopy, led by the teacher. The goal is for students to recognize the different tissues and organs found in a collection of histological preparations processed with basic techniques.

**3. Interdisciplinary work**

This is a mandatory activity crosscutting interdisciplinary common to all subjects of the second degree course in Biology.

Each working group will hold a seminar consisting of a written and an oral presentation on a topic assigned by lot from among those proposed by teachers. The work shall be considered related to the subject on which depends the issue and will be assigned a tutor and a co-tutor.



Students of the course, the tutor of work and an assistant professor will attend seminars and participate in the selection of the work that, by its quality and originality, will be presented at the Congress of Biology.

Alternatively, to this activity any other transversal activity backed by CAT can be carried out as part of a project of educational innovation.

#### **4. Student's class work**

Should be considered as all the work that the student engaged in the preparation of the course regardless of attendance at lectures, practicals, seminars, tutorials and exams.

Are considered: a) the hours of study each week to be spent to expand and consolidate the knowledge acquired in class, b) the additional work that the teacher can plan for the student to perform throughout the semester as an adjunct classes of theory and practice (eg. answering questionnaires).

Finally, include tutorials to monitor the degree of student learning. These are one-hour sessions to solve problems or address issues of interest.

### **EVALUATION**

It will be considered the knowledge gained in theory, practice, and interdisciplinary activity. The course is divided into two "blocks of assessment" independent: theoretical (with optional midterm exam) and practical block (90%) and block interdisciplinary activity (10%). The evaluation of other activities (lectures, discussion of articles and current affairs ...), link, if appropriate, the evaluation of theoretical and practical block.

**Block theory and practice:**

To assess knowledge of theory and practice block, the student will make two written exams: one with questions about theory and other with questions practical sessions. Optionally, an oral interview or additional questionnaire may be convened to confirm the qualifications rate. To pass this block, students must earn a minimum of 5 points out of 10 in both examinations independently. When both tests are passed, the final mark for the block will be 80% of the theory mark and 20% of the practice mark.

If any of the two tests did not obtained a minimum of 5 out of 10, will be discontinued completely theoretical and practical block and therefore the course is suspended. In the case that one of the two exams would be suspended, the qualification of the approved one would be saved until next call. No qualification is saved for following course and the practical classes must be repeated.

**Block interdisciplinary activity:**

The mark obtained in interdisciplinary work will involve 10% of the final grade for the course. Participate in the rating the tutor and an assistant professor at the oral work (with a relative weight corresponding to 60% and 40% respectively). The assessment of this activity includes both the science content covered, such as how they have been presented, especially valuing the ability to communicate and transmit ideas and concepts. The papers selected for presentation at the Congress of Biology have an extra qualification, equivalent to 10% of the grade of this activity.





In the event that the subject is suspended, the qualification of the interdisciplinary work will be saved for the next course.

In the event that the interdisciplinary work is not carried out, the subject linked to this interdisciplinary work will be suspended and if the rest of the subject is approved, the grade will be saved until the next year.

In the case of not carrying out the interdisciplinary work, and if the subject is not linked to the work, it will be necessary to obtain a grade equal to or greater than 5 out of a maximum of 9, as the interdisciplinary activity has not been developed.

## REFERENCES

### Basic

- Alberts, B., et al. (2016) *Biología Molecular de la célula*, 6a ed, Omega, Barcelona
- Bloom y Fawcett (1995) *Tratado de Histología*. 12ª ed, Interamericana
- Cutter (1978) *Anatomía de las Plantas*. L. Cárcamo
- Esau (1977) *Anatomy of Seed Plants*. Wiley
- Fahn (1985) *Anatomía Vegetal*. Blume
- Ferrer Amoros (1997). *Las celulas de los tejidos vegetales*. Ediciones Vedral
- Garcia del Moral R. (1993).- *Laboratorio de anatomía patológica*. Interamericana-McGraw-Hill
- Gartner (2021) *Texto de Histología*, 5a ed. Elsevier
- Geneser, F. (2000). *Histología, sobre bases biomoleculares*. 3ª ed. Médica Panamericana, Buenos Aires
- Junqueira & Carneiro (2005) *Histología básica*. 6onª ed. Mass
- Krstic (1989) *Los tejidos del Hombre y de los Mamíferos*. McGraw Hill
- Paniagua et al. (1997). *Citología e Histología Vegetal y Animal*. 2ª ed. Interamericana-McGraw-Hill
- Pawlina, W. (2015). *Ross. Histología. Texto y Atlas color con Biología Celular y Molecular*. 7ª Ed. Ed. Médica Panamericana
- Ponsoda, X., Nacher, J., Molowny, A. y Lopez, C. (2000). *Manual de Práctiques de Citologia i Histologia*. Servei de Publicacions de la Universitat de València
- Raven et al. (1991). *Biología de las Plantas*. Tomo 1. Reverté
- Rhodin, J.A. (1974).- *Histology: a Text and Atlas*. Oxford Univ. Press
- Sobotta-Welsch U. (1999). *Histología (atlas en color de anatomía microscópica)*. 5ª ed. Marbán
- Welsch (2013) *Sobotta Histologia*. 3ª ed. Panamericana
- Young, B., Heath, J.W. y Woodford, P. (2014). *Wheaters Histología funcional. Texto y Atlas en Color*. 6ª ed. Elsevier España



### **Additional**

- Gilbert, S.F. and Barresi, M.J.F. (2016). Developmental Biology, 11th ed. Sinauer Associated Inc.
- Torrey y Feduccia (1978) Morfogénesis de los Vertebrados. Limusa
- Welsch y Storch (1980) Estudio Comparado de la Citología e Histología Animal Comparada. Labor

## **ADDENDUM COVID-19**

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

In the event that there were restrictions on the access to the classrooms due to the pandemics and face-to-face teaching is not recommendable, the following modifications to the teaching guide will be made:

### 1.- Contents

The contents initially included in the teaching guide are maintained. Teaching staff will provide the students with the appropriate materials to achieve the initially programmed objectives.

### 2. Volume of work and schedule of teaching

ECTS credits for the activities described in the original teaching guide are maintained, with greater flexibility, adapting to the circumstances that could arise as the consequence of the state of the pandemics. Face-to-face sessions would be substituted by online tutoring (chat, email or other kinds of on-line lecturing, depending on the technical possibilities). Complementary self-assessment activities are included for the students as part of the on-line training.

### 3. Teaching methodology

To replace face-to-face lectures, on-line tutoring/consulting (chat, virtual classroom forum and / or emails) is reinforced, as well as the provision of additional materials properly considered to replace in situ lecturing. In this regard, for example, new slide presentations or notes, and self-assessment questionnaires, will be distributed to facilitate the autonomous work of the student in conditions of non-attendance to the classroom.

### 4. Evaluation

If complementary self-assessment activities are employed to evaluate students, these tasks will have a weight of up to 20% within the theoretical-practical score, depending on the degree of implementation of these activities. Then, the evaluation of this section would be modified as follows: up to 20% corresponding to the complementary activities and 80% the exam. Within the exam, the theoretical part will have a weight of 80% and the lab classes content 20%. For the final score, the transversal activities continue to weight a 10% and the exam section (including the complementary activities) 90%. The final exam will be in written and will consist of different parts, including questions of different formats, that will allow to evaluate all the contents and skills of the subject. If an exam cannot be done in person, it will be done using the tools available in the Moodle platform of the University of Valencia. If, for duly justified technical reasons, a student cannot take an exam, the possibility of taking an alternative test will be considered, which, in any case, will be oral.

