

Degree	Type	Year
2500892 Physiotherapy	FB	1

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

There are no official prerequisites.

It is highly recommended that students have taken Biology in the High School.

Objectives and Contextualisation

The subject is programmed in the first year of the Degree in Physiotherapy and is part of the group of the subjects of basic training It constitutes, therefore, part of the scientific basis necessary for graduates in Physiotherapy. Its general objectives are the study of the biochemical, cellular and histological fundamentals of the human organism, as an essential foundation for the knowledge of its composition and its functions.

Competences

- Analyse and synthesise.

- Display knowledge of the morphology, physiology, pathology and conduct of both healthy and sick people, in the natural and social environment.
- Display knowledge of the sciences, models, techniques and instruments around which physiotherapy is structured and developed.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Solve problems.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Analyse and synthesise.
3. Communicate using language that is not sexist.
4. Explain the functioning of the the human body in health in order to have a sound basis for understanding the processes that induce disease.
5. Explain the fundamental biochemical principles of the functioning of the human body.
6. Explain the theories of cell biology, envisioning the cell as a functional unit.
7. Identify life-threatening situations and perform basic and advanced life support manoeuvres.
8. Identify physiological and structural changes that can take place as a result of the injury and/or disease process in the different systems.
9. Identify situations in which a change or improvement is needed.
10. Propose new methods or well-founded alternative solutions.
11. Propose new ways to measure success or failure when implementing innovative proposals or ideas.
12. Solve problems.
13. Weigh up the risks and opportunities of suggestions for improvement: one's own and those of others.

Content

In this area, the study of the cell is intended as a functional unit, the biochemical foundations of the cell functioning of the human body and human histology. The study of the operation of the different systems of the human body. In addition, general physiopathology will be studied and deepened in the inflammation and tissue repair processes, pain, infection, fever and aseptic condition. Basic life support, neoplastic pathophysiology, immunodeficiencies and blood groups will be also studied.

1.- BIOCHEMISTRY. (module coordinator: Enrique Claro, enrique.claro@uab.cat)

Distributive areas:

I. Structure and Function of Biomolecules

- Water, weak acids and biological buffers.
- Amino acids, peptides and proteins.
- Three-dimensional structure of proteins.
- Proteins with structural function: Collageen.
- Proteins with catalytic function: Enzymes.
- Hormones, embrane receptors and cell signaling.
- Nucleotides and nucleic acids.
- Glucides.

- Lipids.

II. Introduction to metabolism

- Definition of nutrients, foundations of digestion and absorption of nutrients
- General principles of bioenergetics. Role of ATP in energy transfers
- General characteristics of intermediate metabolism: catabolic and anabolic pathways

III. Metabolism of carbohydrates

- Digestion and absorption of carbohydrates
- Metabolism of carbohydrates: Glucolysis, gluconeogenesis and metabolism of glycogen
- Cycle of tricarboxylic acids
- Mitochondrial electronic transport and oxidative phosphorylation

IV. Metabolism of lipids

- Digestion, absorption and transport of lipids in the diet
- Metabolism of lipids with energy and reserve function
- Cholesterol metabolism
- Transport of lipids in the blood: lipoproteins

V. Metabolism of nitrogen compounds

- Nitrogen balance. Exogenous and endogenous origin of amino acids
- Metabolism of amino acids
- Nitrogen derivatives of amino acids

VI. Integration and control of metabolism

- Metabolic characteristics of some tissues: Liver, muscle, adipose tissue, brain
- Metabolic interrelations between the tissues during the fasting-starvation cycle
- Hormonal and metabolic changes during exercise

2.- CELLULAR BIOLOGY. (module coordinator: Maria Oliver Bonet, maria.oliver@uab.cat)

Distributive areas:

Introductory course (online), optional: Levels of cell organization

- General organization of the cell
- General characteristics of prokaryotic cells
- General characteristics of eukaryotic cells

I. Plasma membrane and internal membranous system

- Cell membrane functions

- Chemical composition, structure and macromolecular organization of the plasma membrane. Plasma membrane lipids and proteins
- Transport of small molecules, macromolecules and particles. Endocytosis, pinocytosis, phagocytosis, exocytosis
- Glycocalyx
- Internal compartmentalization: internal membranous system, membrane flow, protein trafficking between compartments
- Smooth and rough endoplasmic reticulum. Structure and functions
- Golgi apparatus: Structure and functions

II. Mitochondria and peroxisomes

- External and internal membranes and mitochondrial intermembrane space. Mitochondrial matrix
- Function and Biogenesis
- Mitochondrial protein transport
- Mitochondrial diseases
- Peroxisome morphology. Structure, composition and function. Peroxisomal diseases

III. Cytosol and cytoskeleton: cell movement

- Structural organization of the cytosol. Functions
- Actin filaments: Structure and chemical composition. Stable and unstable actin filaments. Functions
- Microtubules. Structure and chemical composition. Labile and stable microtubules. Functions
- Intermediate filaments: Structure and chemical composition. Type and location
- Cell adhesion: molecules, adhesion and cell binding. Types of junctions: occlusive, anchor, cell-cell adhesives, matrix cell adhesives, and communicants
- Cell movement. Lymphocyte transfer

IV. Nucleus. Nuclear activity

- Nuclear envelope. Nuclear sheet and matrix
- Nucleoplasm. Structure and organization of nucleus chromatin: hereditary material
- Chromatin activity: Transcription and maturation, replication
- Cell division: mitosis. Phases of mitosis: prophase, prometaphase, metaphase, anaphase, telophase

V. Cell communication

- Signals and pathways of cellular communication
- Cellular responses to signals: cell regeneration

Seminars

- Introduction to Genetics and Inheritance. Set of characters that transmit individuals to offspring depending on the segregation of the genome and genetic laws.

3.- HISTOLOGY. (module coordinator: Bernardo Castellano, bernardo.castellano@uab.cat)

Area distribution:

I. Introduction to the tissues of the human body

- Introduction to Histology. Definition of tissue.
- Classification of the basic tissues
- Histological processing

II. Nervous system

- Central nervous system (CNS) and peripheral (SNP)
- Basic structure of the CNS: white substance and gray substance
- Main areas of the CNS and its organization
- Description of the main constituent elements of the SNP: spinal and visceral ganglia, plexus and nerves

III. Locomotive apparatus

- Structure of the bones and joints
- Tendons and fascia
- Skeletal muscular fibers and their types
- Neuromuscular joints

IV. Cardio-respiratory system

- Components of the cardiovascular system
- Blood and lymph vessels
- Organization of the cardiac wall
- Elements of the driving system of the heart
- Components of the respiratory system: trachea, bronchial system and lungs

V. Genitourinary tract

- Microscopic structure of the kidney
- Urinary tracts: tunics
- Histological structure of the male and female genital tract

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Class practices	7	0.28	2, 1, 3, 4, 6, 8, 9, 13, 10, 11, 12
LABORATORY PRACTICES (PLAB)	8	0.32	2, 1, 3, 8, 9, 13, 10, 11, 12
Specialized seminars	11	0.44	2, 1, 3, 5, 6, 9, 13, 10, 11, 12
Theory	40	1.6	2, 3, 5, 6
Type: Autonomous			
Elaboration of dossiers	19	0.76	2, 1, 3, 5, 6, 9, 13, 10, 11, 12
Individual study	134	5.36	2, 1, 5, 6, 9, 12

As stated in the table.

The theoretical classes for the Histology block will be conducted in a telepresence format, and students will access them from the theory classroom. Under no circumstances can these classes be accessed from outside the classroom or at a later time.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of the practical sessions	10-25%	3	0.12	2, 1, 3, 4, 5, 6, 8, 7, 9, 12
Written evaluation using tests	70-80%	3	0.12	2, 1, 3, 4, 5, 6, 8, 7, 9, 13, 10, 11, 12

This subject does not provide the single assessment system

In this subject, each thematic block (Biochemistry, Cell Biology and Histology) is evaluated independently in two calls.

The first evaluation will be done at the end of each thematic block. The final grade of the subject will be the average of the grades of the three thematic blocks. In order to average, at least two of the three modules must have been passed with a 5 or higher, and the remaining module must have a grade equal to or higher than 4. The subject will be passed if the score resulting from the average of the three modules is equal to or greater than 5.

All those who do not comply with this premise must take a second exam. In this second call, the three thematic blocks will be evaluated independently in a single session. Students may choose which module or modules they want to take the exam, in order to be able to fulfill the previous premise.

Students who want to improve their mark on the midterm exams may also apply for this call. Applying for the grade improvement means giving up the grade obtained in the partial. The notes for each thematic block can be improved independently.

From the second enrollment onwards, repeat students will only have to be assessed on specific blocks that have not been passed. This exemption will be maintained for a period of three additional registrations.

Evaluation system:

THEORY: Written evaluation using objective tests, multiple selection items or essay tests Restricted questions with an approximate global weight between 70 and 80%.

PRACTICE: Evaluation of practical sessions and practical cases using objective tests

Writings, test tests for restricted questions, which are complemented with item proofs

Multiple choice or alternate response items with an approximate weight of between 10 and 25%.

Attendance and active participation in class and seminars, with an approximate global weight of 5%.

Failure to attend any or all of the parts of the final exam will correspond to a final grade of "No evaluable".

- Evaluation of Biochemistry:

THEORY:

- Final exam, which can represent between 70-100% of the final mark. This exam includes a multi-answer test and a part of conceptual questions / problems. The average of the two sides gives the note of the exam.

SEMINARS:

- Continuous assessment exercises associated with the seminars, which can represent between 0-30% of the final note. Only the continuous evaluation note will be considered when it is higher than the grade of the final exam, and therefore helps to increase the final grade.

The final mark of the Biochemistry module will have a value of 33.3% of the mark of the subject.

- Evaluation of cell biology:

THEORY and SEMINARS:

The evaluation consists of a final exam, which may consist of a multi-answer test, with a single correct answer, and / or short reasoning questions, which corresponds to 60% of the grade. In order to pass the Cell Biology module in the first call, the mark of this exam must be higher than 5. If the grade is less than 5, you can choose to recover the module in the recovery exam. This may be a multiple-choice exam or an exam of short conceptual questions. This recovery exam also allows, to students who so wish, to improve the grade obtained in the final exam. In the latter case, taking this exam means renouncing the mark of the first multiple-choice exam.

CLASSROOM PRACTICE:

1. The evaluation of the bibliographic work on diseases corresponds to 40% of the grade. The teamwork carried out in the public oral presentation of one of the proposed diseases (40% of the total activity), the degree of assumption of contents of the disease developed by the student's group (40% of the total activity), and the degree of assumption of contents of the other diseases developed in the same academic year by the other groups (20% of the total activity) will be valued- This last point will be qualified based on a test of 10 to 12 multi-answer questions, to be carried out on the same day of the final exam. In cases of second or subsequent enrollment, it is not necessary to re-carry out the activity, as long as the grade has been equal to or greater than 5. In these cases, the qualification obtained in the bibliographic work on diseases in previous courses will be applied to the calculation of the final grade. That is, the note of the activity is saved to the repeaters.

The final grade of the Cell Biology module will have a value of 33.3% of the grade of the subject.

Histology Evaluation

THEORETICAL EXAM (50%)

- Final exam consisting of true/false questions and image interpretation questions. To pass the partial exam, a minimum grade of 5 is required.

CONTINUOUS ASSESSMENT ACTIVITIES (50%)

- Moodle Classroom: Continuous assessment exercises associated with the seminars to be completed through the Moodle and/or Teams platform, accounting for 20% of the grade.
- Practicals: Continuous assessment tests, conducted during the practical sessions of the subject, covering theoretical concepts and image interpretation. These account for 30% of the grade.

To pass the module of the subject (Partial exam + continuous assessment activities), it is necessary to meet the minimum requirements for each part and obtain a minimum grade of 5, after applying the corresponding percentages. If the theoretical exam is not passed, a final exam with the same characteristics as the partial exam will be conducted.

The final grade of the Histology module will constitute 33.3% of the overall grade for the subject.

Bibliography

1-BIOCHEMISTRY

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https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma99101060272206709

2- CELL BIOLOGY

- *ESSENTIAL CELL BIOLOGY*. Alberts *et al.* Ed. Garland Science, 4th ed. 2014

- *INTRODUCCIÓN A LA BIOLOGÍA CELULAR*. Alberts *et al.* Ed. Panamericana, 2ª ed. 2008

- *MOLECULAR BIOLOGY OF THE CELL*. Alberts *et al.* Ed. Garland Science, 6ª ed. 2015

- *LA CÉLULA*. Cooper & Hausman. Ed. Marbán, 6ª ed. 2014

- *INTRODUCCIÓN AL CUERPO HUMANO. FUNDAMENTOS DE ANATOMÍA Y FISIOLOGÍA*. Tortora y Derrickson. Ed. Panamericana, 7ª ed. 2008

3- HISTOLOGY

- *HISTOLOGIA Y BIOLOGIA CELULAR*. Kierszenbaum y Tres. Editorial Elsevier Saunders, 2020, 5ª edición.

- *ROSS. HISTOLOGIA: TEXTO Y ATLAS*. Pawlina W. ED. WOLTERS KLUWER HEALTH, 2020, 8ª Edición.

- *HISTOLOGIA: ATLAS EN COLOR Y TEXTO*. Gartner. Ed. Ovid Technologies, 2023, 8ª Edición.

Software

There is not a need of specific software in this subject

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	101	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	102	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	103	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	101	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	102	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	103	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	104	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	101	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	102	Catalan	first semester	morning-mixed
(SEM) Seminars	103	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	104	Catalan/Spanish	first semester	morning-mixed
(TE) Theory	101	Catalan/Spanish	first semester	morning-mixed