

26313 - Basic physiological principles for physical activity and sport

Información del Plan Docente

Academic Year	2017/18
Faculty / School	229 - Facultad de Ciencias de la Salud y del Deporte
Degree	295 - Degree in Physical Activity and Sports Science
ECTS	12.0
Year	2
Semester	Annual
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The first part of the course has a basic character orientation, focused on understanding the fundamentals General Physiology. The second part helps the student to understand Exercise Physiology. The overview of the knowledge acquired in lectures, is complemented by the laboratory practical activity. To better track the learning process teachers encourage students to use the tutorial hours.

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5.2. Learning tasks

Theoretical and practical classes will be imparted and tutorials are available for students.

5.3. Syllabus

I: General Physiology

Seminaries

1. Carbohydrates
2. Proteins and lipids
3. Energetic metabolism
4. pH and its regulation

Theoretical program

General Physiology

1. Physiology concept. Internal environment and homeostasis
2. Cellular physiology fundamentals
3. Micronutrients and water
4. Transmembrane transport

Nerve and muscle

1. Action potential
2. Functional structure of muscle.
3. Muscular contraction
4. Neuromuscular junction. Excitation-contraction coupling
5. Motor unit. Biophysics of contraction. Isotonic and isometric contraction. Regulation of force

Nervous system

1. Functional organization of nervous system
2. Sensitive functions of nervous system
3. Reflex action
4. Motor activity regulation
5. Autonomous nervous system

Kidney and internal environment

1. Biological fluids. Structure and general functions of kidney
2. Glomerular filtration. Tubular reabsorption and secretion
3. Hydroelectrolytic balance. Micturition

Immunity and blood

1. General functions of blood. Components
2. Red cells. Iron metabolism. Blood groups
3. Platelets. Hemostasis
4. White cells. Immunity

Cardiovascular system

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1. Circulatory system: characteristics and general functions
2. Electric activity of the heart
3. Mechanical activity of the heart. Cardiac cycle
4. Regulation of Cardiac function
5. Arterial physiology. Microcirculation
6. Lymphatic and venous return
7. Regulation of blood flux. Local circulations

Respiratory functions

1. Function of respiratory airways. Respiratory muscles
2. Thoracic pressures. Respiratory mechanics. Pleura and pleural fluid functions
3. Respiratory cycle. Alveolar ventilation. Respiratory membrane. Oxygen consumption
4. Blood gases transport. Regulation of respiration

Digestive functions

1. Functions of mouth, esophagus and stomach
2. Biliar and exocrine pancreatic secretions
3. Intestinal physiology. Faeces.

Endocrine system

1. Endocrine system. Hormones. Hypothalamus pituitary axis. Endocrine pancreas. Suprarrenal glands

Practical program

1. Nervous exploration
2. Exploration of senses
3. Electromyography and dynamometry
4. Urine analysis. Sediment
5. Hematocrit
6. Blood groups
7. Blood pressure and pulses. Changes during exercise
8. Basal electrocardiogram
9. Basal spirometry
10. Glycemia.

II. Exercise physiology.

Theoretical program

1. Introduction to exercise physiology. Historical perspective and key concept.
2. Energy system and exercise.
3. Muscular responses and adaptations to physical exercise.
4. Cardiovascular responses and adaptations to physical exercise.
5. Pulmonar responses and adaptations to physical exercise.
6. Aerobic functional capacity.
7. Anaerobic functional capacity.

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8. Neuroendocrinic responses and adaptations to physical exercise.
9. Renal gastrointestinal function and physical exercise.
10. Age and gender related to physical exercise: children, older people and women.
11. Environmental stress and physical exercise. Thermal stress, hyperbaria and altitude.

Programa práctico

1. Physical work assessment. Ergometers.
2. Work, power and energy.
3. Indirect calorimetry.
4. Electromiography and exercise.
5. Heart rate and blood pressure response to exercise. Heart rate monitors.
6. Anaerobic threshold determination by ventilatory and cardiologic methods
7. Lactate threshold
8. Oxygen consumption assessment.
9. Oxygen consumption stimation. Problems.
10. Physiological simulation. PhysiLogical.
11. Thermal regulation problems.
12. Video "El éxito de los keniatas".

5.4.Course planning and calendar

The first day of class activities schedule will be communicated

5.5.Bibliography and recommended resources