

26802 - Ocular and Visual System Physiology

Syllabus Information

Academic Year: 2018/19
Subject: 26802 - Ocular and Visual System Physiology
Faculty / School: 100 - Facultad de Ciencias
Degree: 297 - Degree in Optics and Optometry
ECTS: 6.0
Year: 1
Semester: First semester
Subject Type: Basic Education
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The subject of Ocular Physiology and Visual system aims to the student to learn the normal functioning of the human eye and the role that makes each one of the structures of the same. It also allows to know as he is done sending the information to the brain and the mechanisms of formation of image in the cerebral cortex. The knowledge of normal operation can also analyze the variations that occur in situations of concurrent with a poor visual function.

OBJECTIVES.

The objectives to achieve are:

To describe the function of organs and systems of the human body and the regulatory mechanisms on the physiological conditions

To know the bases of functioning of the eye and its variations in normal

conditions and eye diseases more frequent.

To design practice tests to check functions of eye.

To perform final reports to evaluate the visual system in physiological conditions.

4.2.Learning tasks

Practical program.

Practice 1. Behavior of an optician with your patient.

Practice 2. Medical records and first eye tests without the use of appliances.

Practice 3. Astigmatism, diagnosis and keratometry measurement.
Breakthrough time of the tear film.

Practice 4. Visual acuity. Retinoscopy. Duochrome test.

Practice 5. Test stereoscopy. Fundus oculi.

Practice 6. Biomicroscopy: exploring the main ocular structures.

4.3.Syllabus

Physiology General.

Theme 1. Concept of physiology. Characteristics of organism. Concept of internal environment: homeostatic control systems.

Theme 2. Cellular physiology. Cell structure. Transport of substances through the membrane. Membrane potential: origin of these potentials, resting potential and action potential: depolarization and repolarization.

Theme 3. Circulatory physiology. Physical characteristics. Structure microcirculation. Blood flow in the capillaries. Exchange of nutrients. Control mechanisms of local blood flow.

Theme 4. Tissue respiration. Erythrocyte: origin and structure. Hemoglobin. The iron ion. Transport of oxygen and carbon dioxide. Gas transport regulation: a peripheral and central control. Anaemia.

Theme 5. Haemostasis. Platelets origin and structure. Haemostasis mechanisms mechanisms: factors and pathways. Fibrinolysis. Anticoagulants.

Theme 6. Immunity. Leukocytes: origin and classification. Antibodies: structure. Types of immunity. Allergy and hypersensitivity. Blood groups. HLA system.

Theme 7. Nervous system. Organization of the nervous system. Structure of the neuron. Nerve transmission and synapses. Sensory nervous system receptors. Motor nervous system. Functioning of the central nervous system: spinal, subcortical and cortical. Pathophysiology of pain.

Ocular physiology and visual system.

Theme 8. The eye. General characteristics. External ocular examination. Semiotics: general concepts.

Theme 9. Eyelids. Eyelid movement. Central control of the movement of the eyelids. Introduction to palpebral pathology.

Theme 10. Conjunctiva. Structural basis. Exploration. Function. Conjunctiva inflammation.

Theme 11. Lacrimal apparatus. Composition and function of the tear film. Regulation of secretion. Lacrimal drainage mechanism. Pathology.

Theme 12. Cornea and sclera. Structural features. Corneal nutrition and metabolism. Transparency. Electrophysiology and transportation. Mechanisms of corneal repair. Effects of contact lenses. Hydration of the sclera. Healing of wounds. Permeability of the sclera.

Theme 13. Aqueous humor. Formation and composition. Drainage mechanisms. Intraocular pressure. Factors that regulate the formation and secretion. Glaucoma.

Theme 14. Iris and pupil. Functions. Clinical significance of the pupil. Light reflex. Pupillary defects.

Theme 15. Lens. Differentiation of lens cells. Cellular biochemistry. Cellular metabolism. Transparency and refraction. Accommodation. Presbyopia.

Theme 16. Vitreous body. Biochemical and biophysical aspects of its composition. Physiological functions. Aging.

Theme 17. Ocular circulation. Irrigation of the eye: retinal vessels and uveal vessels or ciliary body. Role of the choroid. Measurement of ocular blood flow.

Theme 18. Retina. Histological and functional organization. Photoreceptors: rods and cones. Retinal pigment epithelium. Biochemical mechanisms and visual cycle. Light response of retinal neurons. Retina scan: fundus, electroretinography.

Theme 19. Optic nerve. Axons, oligodendrocytes, schwann cells, astrocytes. Irrigation. Synaptic transmission of the retinal ganglion cell. Excitotoxicity. Axonal conduction. Destination of optic nerve axons. Axonal injury. Optic nerve regeneration.

Theme 20. Central neurophysiology of vision. Geniculate-cortical pathway. Primary visual cortex. Extrastriate visual cortical areas. Via extrageniculate. Binocular vision: neural basis of stereopsis. Color vision: neuropsychology.

4.4.Course planning and calendar

4.5.Bibliography and recommended resources

- BB** Adler, Francis H.. Adler fisiología del ojo : aplicación clínica / editado por Paul L. Kaufman, Albert Alm . - 10ª ed. Madrid : Masson, cop. 2004
- BB** Guirao Piñera, Antonio. Óptica visual / Antonio Guirao Piñera . 1ª ed. Murcia : DM, 2004
- BB** Guyton, Arthur C.. Tratado de fisiología médica / Arthur G. Guyton, John E. Hall . - 11ª ed., [1ª reimp.] Madrid [etc.] :
- BB** Lang, Gerhard K.. Oftalmología : texto y atlas en color / Gerhard K. Lang ; con la colaboración de Oskar Gareis ... [e Barcelona [etc.]: Masson, 2006