

PHYSIOLOGY

[in PHARMACOLOGY AND PHYSIOLOGY OF THE EXERCISE]

Course ID: BIO/09

ECTS: 5

1st Year: 2nd semester

Teacher: PROF. BOSCO Gianfranco

Objectives: Providing knowledge on the physiology of motor control and on the pharmacology of exercise.

Program:

Physiology module: General aspects of the sensory systems and psychophysical laws.

Somatosensory system. Morphofunctional characteristics of tactile mechanoreceptors, muscle spindles, Golgi tendon organs, thermal receptors and nociceptors. Central processing of somatosensory information. Functional organization of the primary and secondary somatosensory cortices.

Vision. Retinal function and phototransduction. Central processing of visual information. Parallel processing of motion, shapes and color.

Motor systems. Organization principles of motor control: Feed-forward and feed-back control. Hierarchical organization.

Spinal functions. Reflex responses: the stretch reflex, the withdrawal (flexion) reflex. Neurophysiological basis of locomotion.

Vestibular system. Functional anatomy of the vestibular organs. Central processing. Vestibulo-spinal and vestibulo-ocular reflex.

The cerebellum. Anatomofunctional organization. Basic circuitry of the cerebellar cortex. Cerebellar role in motor control. Procedural learning.

Basal Ganglia. Functional organization of cortico-striatal loops. Decision-making. Reward learning
Postural control. Multisensory integration and control strategies.

Oculomotor control. Saccadic and pursuit systems.

Cortical control of goal-directed movements. Functional organization of the primary motor cortex.
Pre-motor areas and visuo-motor coordination.

Textbooks: Purves, Neuroscience ed. Zanichelli

Exam method: oral exam