Department of Human Physiology and Pathophysiology

PHYSIOLOGY - CLASSES (44 h), Spring semester 2023/2024

No.	Topic	Tutor	Hours
1	**Cardiovascular system 3 (21/22.02.24.)** Cardiac muscle and the heart. Conduction pathways, myocardial autorhythmic cells. The sequence of the activation of the myocardium. The stages of the cardiac action potential. Cardiac Cycle, five phases of the cardiac cycle, the mechanical and electrical events that occur during one cycle. Simulation experiment program SimHeart: heart rate under the influence of the sympathetic and parasympathetic system, hormones and other substances	A. Bossowska, Associate Professor	4 h
2	**Cardiovascular system 4 (28/29.02.24.)** Electrocardiography and Heart sounds: Auscultation, normal heart sounds measured by a stethoscope and a cardiomicrophon. ECG- the transthoracic electrical activity of the heart , Limb bipolar, augmented and pericardial unipolar leads; electrical activity record of the limb leads I, II and III – Einthoven's triangle and axial reference system. Identification and analysis of the amplitude and the duration of the major components of the ECG (P wave, QRS complex, T wave, QT-interval). Calculation of the heart rate from ECG. The time relationships between electrical and mechanical activity of the heart, simultaneously measured by ECG and by the auscultation. The heart rate variability between individuals. Respiratory sinus arrhythmia. Contraction of the ventricular mean electrical axis.	A. Skowrońska, Associate Professor	4 h

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fax (89) 524 53 07

	CARDIOVASCULAR	**COLLOQUIUM (19.03.2024)**	**C4**
3	**Gastrointestinal system 1 (06/07.03.2024.)** Overview of digestive processes. Specific of enzyme action, impact of temperature and pH levels on enzyme activity. The effects of amylase on starch, determine the optimal pH level at which amylase works, and observe the effects of temperature on enzyme activity. Salivary amylase and cellulose. Pepsin.	A. Bossowska, Associate Professor	4 h
4	**Gastrointestinal system 2 (13/14.03.24.)** Electromyography. Structure and function of the contractile system in smooth muscles. Types of smooth muscle - single-unit and multi-unit smooth muscles. Regulation of contraction by calcium ions. Neuromuscular junctions of smooth muscle. Membrane potentials and action potentials in smooth muscle. Nervous and hormonal control of smooth muscle contraction (simulation programs).	A. Bossowska, Associate Professor	4 h
5	**Gastrointestinal system 3 (20/21.03.24.)** Digestion and absorption of carbohydrates mainly glucose and surcose in small intestine. Blood sugar level, hypoglycemia.	A. Bossowska, Associate Professor	4h
	GASTROINTESTINAL SYSTEM	**COLLOQUIUM (09.04.2024.)**	**(C5)**
5	**Respiratory 1 (27/28.03.24.)** Mechanics of respiration. Normal and rapid breathing, duration of the respiratory cycle, inspiratory time and expiratory time, peak inspiratory and expiratory flows. The effects of holding breath after inhaling and after exhaling. The effect of voluntary hyperventilation on breath-holding and the recovery of normal breathing rhythm. Rate of breathing or frequency. Variations in breathing. Rebreathing exhaled gases. Hypercapnia. The effect of breath-holding on heart rate. - 4h.	A. Skowrońska, Associate Professor	4 h

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6	**Respiratory 2 (10/11.04.24.)** Respiratory Volumes. The principles of spirometry and how integration of the flow signal gives a volume. Lung volumes and capacities. Measuring normal respiratory volumes ventilatory function tests: static lung volumes, dynamic lung volumes (VC, ERV, PEF, FVC, FEV1). Tiffeneau test. Relate recorded lung volumes and capacities, to those of a typical person of the same gender, height and age. The effect of airway restrictions on PIF, PEF, FVC and FEV1. - 4h.	A. Skowrońska, Associate Professor	4 h
7	**Exercise Physiology (17/18.04.24.)** Exercise physiology, energetic processes and physiological changes during physical efforts. Cardiovascular, respiratory and metabolic effects of exercise. Acute and chronic physiological changes in response to exercise stress. Classification of physical efforts. Aerobic endurance. Aerobic fitness testing (muscular fitness, cardiovascular and cardiorespiratory analyses, maximal rate of oxygen consumption - methods of measurement). Fatigue and recovery after exercise. 4h.	E. Lepiarczyk, PhD	4h
	RESPIRATORY AND SPORT PHYSIOLOGY	**COLLOQUIUM (23.04.2024)**	**(C6)**
8	**Kidney 1 (24/25.04.24.)** Mechanisms of urine formation. Reabsorption of nutrients, water, and ions. Regulation of urine concentration and volume. Formation of dilute and concentrated urine. Antidiuretic Hormone (ADH). Water balance.	M. Majewska, Associate Professor	4 h
8	**Kidney 2 (08/09.05.24.)** Urinalysis test strips. Physical characteristics of urine. Chemical composition of urine. Microscopic examination of urine sediment.	M. Majewska, Associate Professor	4 h
	KIDNEY	**COLLOQUIUM (14.05.24.)**	**(C7)**

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10	**Reproductive system 1 (15/16.05.24.)** Principles of hormonal regulation of reproduction. The male reproductive system. Spermatogenesis. Components of semen. Experiments on assessment of the viability of sperm, influence different environmental changes on their survivability. Organs of the female reproductive system. Physiological changes during menstrual cycles in women. Determination the phase of women's cycle on the basis of microscopic image of the saliva, urine-based ovulation tests and vaginal smear of the rat. Conventional and LBC cytology.	M. Majewska, Associate Professor	4 h
11	**Reproductive system 2 (05/06.06.24)** Oogenesis and follicular development. Isolation of swine oocytes from ovaries. Fertilization. Human chorionic gonadotropin and pregnancy tests. The role of hormones in labor and delivery, initiation of labor, the role of oxytocin, production and primary sources of oxytocin Lactation, regulation of hypothalamus-pituitary axis and function on lactation. Hormone stimulates milk production. Detection of casein in milk and colostrum. Observation of fat in the milk.	M. Majewska, Associate Professor	4 h

THE COLLOQUIUM IS SCHEDULE AT THE TIME OF LECTURE AND THE PLACE IS THE SAME AS LECTURE!

Guyton and Hall "**Medical Physiology**" 13th Edition or 14th Edition 2020, Elsevier
Linda S. Costanzo "**Physiology"**, (6th Edition) 2018 or 2022 Wolters Kluwer Health
Guyton & Hall" **Physiology Review"** 2021 Elsevier, Health Sciences Division

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