



Department of Human Physiology and Pathophysiology

PHYSIOLOGY - CLASSES (44 h), Spring semester 2024/2025

No.	Topic	Tutor	Hours	Literature
1	Cardiovascular system 3 (26.02.25.) 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	Guyton – Chapter 9 Chapter 10 Costanzo – Chapter 4
2	Cardiovascular system 4 (05.03.25.) Electrocardiography and Heart sounds: Auscultation, normal heart sounds measured by a stethoscope and a cardiomicrophon. Understanding the ECG, the physical basis of electrocardiography electrocardiogram leads, the normal clinical features of the electrocardiogram. Mean electrical axis. Normal sinus rhythm. A Basic Approach to ECG Analysis. Respiratory sinus arrhythmia.	A. Skowrońska, Associate Professor	4 h	Chapter 11
	CARDIOVASCULAR	COLLOQUIUM (11.03.2025)	C4	
3	Respiratory 1 (12.03.25.) 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-	A. Skowrońska, Associate Professor	4 h	Costanzo Chapter 5 Respiratory Physiology Guyton Chapter 37, 41





	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.			
4	Respiratory 2 (19.03.25.) 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	Guyton: pulmonary volume and capacities, ABBREVIATIONS AND SYMBOLS USED IN PULMONARY FUNCTION STUDIES, Alveolar ventilation, dead space, minute respiratory volume, Costanzo: lung volumes and capacities, dead space physiologic dead space, ventilation rates, forced expiratory volumes.
5	Exercise Physiology (26.03.25) 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, Associate Professor	4h	Medical Physiology Guyton and Hall, Chapter 21 "Muscle blood flow and cardiac output during exercise". Sports Physiology
	RESPIRATORY	COLLOQUIUM (15.04.2025.)	(C5)	
5	Gastrointestinal system 1 (02.04.25.) 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	Chapter 65 Secretory Functions of the Alimentary Tract, Autonomic Stimulation of Secretion, secretion of saliva by a submandibular salivary gland,
6	Gastrointestinal system 2 (09.04.25.)	A. Bossowska,	4 h	Chapter 65 Composition of Bile, Function of





	Digestion of protein. Peptide absorption. Digestion and absorption of fats. Lipase, Bile, and Lipid digestion. The roles of bile salts in emulsion and micelles. Enterohepatic circulation of bile acid. Functions of bile acid.	Associate Professor		bile salts in fat digestion and absorption, Cholecystokinin. Chapter 66 digestion of proteins, digestion of fats.
7	Gastrointestinal system 3 (16.04.25.) Digestion and absorption of carbohydrates mainly glucose and sucrose in small intestine. Blood sugar level, hypoglycemia.	A. Bossowska, Associate Professor	4h	Chapter 65 Secretion of the small intestine. Chapter 65 digestion of carbohydrates Basic principles of gastrointestinal absorption.
	GASTROINTESTINAL SYSTEM	COLLOQUIUM (29.04.2025)	(C6)	
8	Kidney 1 (30.04.25.) 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	Chapter 26 (Regulation of Water and Electrolyte Balances, Micturition, Urine formation, filtration, reabsorption and secretion of different substances). Renal Tubular Reabsorption and Secretion
8	Kidney 2 (07.05.25.) Urinalysis test strips. Physical characteristics of urine. Chemical composition of urine. Microscopic examination of urine sediment.	M. Majewska, Associate Professor	4 h	Chapter 27, 28 (Glomerular Filtration, Renal Blood Flow, and Their Control, GFR, Physiological control of glomerular filtration and renal blood flow). Autoregulation of GFR and renal blood flow. Myogenic autoregulation of renal blood flow and GFR.
	KIDNEY	COLLOQUIUM (13.05.25.)	(C7)	
10	Reproductive system 1 (14.05.25.) 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	M. Majewska, Associate Professor	4 h	Chapter 81 Reproductive and Hormonal functions of the Male: spermatogenesis, hormonal factor that stimulate spermatogenesis, maturation of sperm. Testosterone and other male sex hormones.





	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.			Control of Male sexual functions by hormones from hypothalamus and anterior pituitary gland. Chapter 82 female hormonal system, monthly ovarian cycle function of gonadotropic hormones. The follicular phase
11	Reproductive system 2 (21.05.25) 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	Chapter 82 Oogenesis and follicular development in the ovaries. Chapter 83 Pregnancy and lactation. Hormonal factors in pregnancy.

THE COLLOQUIUM IS SCHEDULE AT THE TIME OF 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

