
		UNIVERSITY OF EAST SARAJEVO Faculty of Medicine					
		Study program: medicine					
		Integrated academic studies		III study year			
Full subject title		PATHOLOGICAL PHISIOLOGY					
Department		Department of preclinical subjects, Faculty of Medicine in Foča					
Subject code			Subject status		Semester		ECTS
ME-02-1-025-5; ME-02-1-025-6			compulsory		V, VI		13
Professor/ -s		Assistant Professor Bojan Joksimović, MD, PhD, Assistant Professor Miloš Vasiljević, MD, PhD; assistant professor Ivan Radić, MD, PhD, assoc. prof. Milorad Vujnic, assist. prof. Alma Prtina					
Associate/ - s		assistant Kristina Drašković Mališ, MD					
Number of lectures/ teaching workload (per week)			Individual student workload (in hours per semester)			Coefficient of student workload S ₀ ¹	
L	E	SP	L	E	SP	L	
3	3	0	45	45	0	1,167	
2	4	0	30	60	0	1,167	
total teaching workload (in hours, per semester) 3*15 + 3*15 + 0*15 = 90 2*15 + 4*15 + 0*15 = 90			total teaching workload (in hours, per semester) 3*15*1,167 + 3*15*1,167 + 0*15*1,67 = 105 2*15*1,167 + 4*15*1,167 + 0*15*1,67 = 105				
Total subject workload (teaching + student): 180 + 210 = 390 hours							
Learning outcomes		1. Through the general and special pathological physiology, the student is introduced to the different causes of the disease and their mechanism of action. 2. It needs to know the mechanisms of the disease and its consequences from the cellular level to the level of the organism as a whole. 3. Understanding the connection between the basic clinical manifestation of the most important functional and organic disorders with the causes and mechanisms of their formation. 4. Knowledge of the place and importance of laboratory and functional tests.					
Competences		They have acquired a systemic thinking approach as well as a structured approach to medical problems during their education. They are prepared for further development and advances within the field of medicine. They are acquainted with methodology of scientific research. They are acquainted with health improvement and disease prevention and are eager to make medical professionals adopt more positive attitude towards it. They are conscious of the necessity for continuous learning and improvement process to maintain a high level of medical competence.					
Preconditions		Passed exam in Anatomy, Histology and Embryology, Physiology and Biochemistry. Requirement for taking the exam: all passed exams from the previous year of study					
Teaching methods		Lectures, seminars and exercises.					
Subject content per week		Lectures 1. Place and role of pathological physiology in medicine. Health and wellness Diseases of manifestation of disease. Current and outcome of diseases. Etiology: types of ethiological factors and their presence in the onset of disease. Pathogenesis: pathogenetic factors and their significance. Reactivity. 2. The following diseases. Significance of age in the occurrence and development of diseases. Aging theory 3. Ethical factors, risk factors. Termic factors. General and local effect of increased temperature. Clinical manifestations of hyperthermia. 4. Thermal factors. General and local low temperature events. 5. Chemical etiological factors. Ezogenic and endogenous intoxication. Biological etiological factors. 6. Pathophysiological aspects of malignant tumors. Most cell death. Response of tumor-host. 7. Inflammation. Biological inflammatory syndrome. Crop: types, stages and types					

¹The coefficient of student workload S₀ is calculated as it follows:

a) for the study programs not going through the licensing process: S₀ = (total workload in semester for all of the subjects 900 hrs – total teaching workload L+E in semester for all of the subjects 870 hrs)/ total teaching workload L+E in semester for all of the subjects ____ hrs = _____. Consult form content and its explanation.
b) for the study programs going through the licensing process, it is necessary to use form content and its explanation.

8. Defensive mechanisms of the organism. Non-specific protection of the organism. Specific protection of the organism and immunodeficiency

9. State of immunological hypersensitivity. Mechanisms of early and late hypersensitivity. A variety of allergic diseases associated with certain types of hypersensitivity. Autoimmunity, etiopathogenesis and types of autoimmune diseases

10. Carbohydrate metabolism disorders. Hypoglycemic and hyperglycemic syndrome. Synthesis and degradation of glycogen.

11. Disturbance of metabolism of proteins. Comparison of neuroendocrine regulation of protein metabolism. Pathogenesis of hypoproteinemia, hypoproteinemia, and dysproteinemia. Disruption of energy balance (imbalance in energy metabolism, positive energy balance, negative energy balance).

12. Pathophysiological Aspects of Enzymopathy. A Comparison of Homeostatic Control of Enzymatic Activity. Types of Enzyme Abnormalities. Functional Effects of Enzyme Deficiency. Pathophysiological Absorbent Balance Apposites. Causes, pathogenesis and consequences of respiratory and metabolic acidosis and alkalosis.

13. Disorders of water metabolism. Etiology and pathogenesis of the main types of disorders of water and salt metabolism. Intracellular, extracellular and global dehydration. Edema. Mineral transport (hypo and hyperthermia, hypo and hypercholelism, hypo and hyperkalemia). Pathophysiological principles of correction of water and salt imbalance

14. Kinetics and bone mineral minerals. Negative and positive balance Ca, P, Mg. Balance of the content of essential microelements

15. Disturbance of traffic and metabolism of vitamins.
Avitaminosis, hypovitaminosis, hypervitaminosis of vitamins soluble in water and fats.

16. Disorder of fat metabolism. Hypercholesterolemia. Metabolic and pathogenetic aspects of atherosclerosis. Substance of metabolism of fat as prevalent signs of diabetes

17. Pathological physiology of respiration. Regulation of respiratory centers (neurogenic, humoral, endocrine). Types, mechanism and consequences of hypoxia. Central disorders of breathing rhythm

18. Ventilation disorders. Hyperventilation, hypoventilation, obstruction, restriction, disorder of ventilation-perfusion relationship. respiratory insufficiency. circulation in the lungs. Excellent edema. Non-epileptic lung function.

19. Heart failure due to changed cardiac function. Treatment of contractility of the heart. Heart failure. Descent of right and left heart failure. Cardiac rhythm disorders. Pathogenesis of arrhythmias. Normalization of impulse. Blown conduction.

20. Hemodynamic disorders that correlate the heart valves. Mitral stenosis and insufficiency. Arterial stenosis and insufficiency. Cardiac filling procedures. Blood flow changes due to changes in arterial pressure. Pathophysiology of arterial hypertension. Pathophysiology of arterial hypotension. Ischemic heart disease. Regulation and disorder of the coronary artery. Metabolic changes in the ischemic heart.

21. Disorder of the function of hematopoietic organs. Border function of the bone marrow. Consequence of bone marrow disorders. Settlement of the function of the spleen. Replication of the red blood cell. Distribution and etiopathogenesis of anemia. Polycythemia. Application of a white bloodline. Granulocytosis and monocytosis. Granulocytopenia and agranulocytosis. Granulocytic and monocytic leukemia .

22. Lymphocytic lobe disorder. Lymphocytosis and lymphopenia. Lymphoproliferative disease, lymphatic leukemia and lymphoma. Hemostatic depression. Hemorrhagic syndrome. Platelet disorder. Causes and consequences of vascular haemostasis phase disorders. Coagulation dysfunction

23. Disorders of the digestive tract. Movement of motor and passage. Etiopathogenesis of ileus. Insulin and diarrhea. Secretion of secretion. Etiopathogenesis of ulcer disease. In the digestive tract. Absorption route. Malabsorption syndrome.

24. Disturbance of exocrine function of the pancreas. Treatment of secretion and insufficiency of pancreatic. Etiopathogenesis of pancreatitis. Zollinger-Ellison syndrome. Ulcerogenic tumors. A comparison of some autochthonous functions of the intestine. Regional enteritis. Change of the bacterial flora in the intestines and its poles. Substance of the colonic function. Carcinoma tumors.

25. Liver function disorders: secretory and metabolic function of the liver.
Liver insufficiency. Detection of liver detoxification. Pathogenesis of hepatic coma and encephalopathies

26. Pathophysiology of the kidney. Etiopathogenesis of glomerulopathy. Pathophysiological aspects of tubulopathy. Glomerulotubular water-electrolyte disbalance. Renal vasculopathy

27. Renal insufficiency. Acute and chronic kidney insufficiency. Metabolic and systemic manifestations of urea. Renal syndromes. Pathophysiological aspects of disorders and regulation of endocrine glands. Hormone secretion. Target tissue disorders. Disorder of hormone metabolism. Hormone secretion due to haemostasis disorders

28. Pituitary function disorder. Pituitary opening of the pituitary gland. Disturbance of the back of the pituitary gland hole. Shifting of the thyroid gland function.
Thyreotoxicosis and hyperthyroidism. Hyperthyroidism. Parathyroid gland disorder. Disorder of the adrenal gland function. Hypo and hyper function of the adrenal cortex. Comparison of the function of the core of the adrenal gland. Feohromocytoma. A disorder of the function of endocrine pancreas. etiopathogenesis of diabetes mellitus.

	<p>29. Pathological physiology of the nervous system. The behavior of irritability and conduction of the nerve impulse in normal ionic conditions and in the action of neurotoxins and metabolic inhibitors. Peripheral nervous system regimens. Somatomotor nervous system. Transmission in the function of the pyramidal and extramidal system. The role of the small brain in coordination of the movement. A somato-sensory system disorder.</p> <p>30. Disturbance of hearing and hearing sensations. Bone-joint disorders.</p> <p>EXERCISES</p> <p>1. Pathophysiological basics of action of etiological factors (mechanical, thermal, action of electric current, atmospheric pressure action of gases)</p> <p>2. Verification exercises "etiological factors" and PBL.</p> <p>3. Inflammation (mechanism of formation, vascular, cellular and metabolic reaction in inflammation.) View by Danilevsky</p> <p>4. Biological inflammatory syndrome (changes in blood, SE, proteins and immunoglobulins in inflammation)</p> <p>5. Verification of exercises "inflammation and biological syndrome of inflammation" and PBL.</p> <p>6. Pathological physiology of local circulation (local arterial and venous hyperaemia, thrombosis, embolism), PBL.</p> <p>7. Hypersensitivity reactions (I, II, III and IV hypersensitivity)</p> <p>8. Diagnosis of allergic diseases ((skin, cytology and serological reactions)</p> <p>9. Verification of the "hypersensitivity reaction and diagnosis of allergic diseases" and PBL.</p> <p>10. Pathophysiological aspects of shock (hypovolemic, cardiogenic, anaphylactic, neurogenic, septic)</p> <p>11. Verification of the "shock" and PBL exercises:</p> <p>12. An acid-base balance disorder (metabolic acidosis and alkalosis, respiratory acidosis and alkalosis)</p> <p>13. Disorders of metabolism (fats, proteins and carbohydrates)</p> <p>14. Verification of exercises "disturbances of acid-base balance and metabolism" and PBL.</p> <p>15. Test from general pathological physiology.</p> <p>16. Patosiological basics of electrocardiography (principles of work, frequency determination, rhythm determination and rhythm disorders, determination of electric shaft)</p> <p>17. Patosiological basics of electrocardiography (determination of hypertrophy, coronary perfusion disorders)</p> <p>18. Pathophysiological basics of functional examination of the cardiovascular system (invasive and non-invasive diagnostic methods)</p> <p>19. Verification of exercises from the KVS system and PBL.</p> <p>20. Pathophysiological basics of functional examination of the respiratory system (examination of ventilation of the lungs, distribution of gases, diffusion of gases, pulmonary perfusion, gas analysis)</p> <p>21. Verification exercises from the respiratory system and PBL.</p> <p>22. Pathophysiological basics of functional tests in digestive system examination (digestive tube test, functional gastric examination, functional examination of exocrine pancreas and interpretation of results)</p> <p>23. Verification exercises from the digestive system and PBL.</p> <p>24. Pathophysiological basics of hemostasis disorders (functional examination of vascular, thrombocyte and coagulation phases and interpretation of results)</p> <p>25. Hematology (erythrocyte and leukocyte disorder)</p> <p>26. Pathophysiological basics of liver function tests (examination of the bilirubin metabolism, role of the liver in the metabolism of proteins, fats and carbohydrates, serum liver enzyme testing, liver detoxification testing, liver blood tests)</p> <p>27. Verification of hepatic and PBL exercises.</p> <p>28. Pathophysiological basics of functional tests in endocrine system testing (functional examination of endocrine glands and interpretation of results), PBL.</p> <p>29. Pathophysiological basics of functional tests in urinary tract examination (diuretic and salurisation disorder, proteinuria, pathological sediment analysis, clearance in urinary tract function) interpretation of results and PBL.</p> <p>30. Test of special pathological physiology.</p>			
Compulsory literature				
	Author/s	Publication title/ Publisher	Year	Pages (from-to)
	Judi Nath	Applied Pathophysiology A Conceptual Approach, fourth edition	2022	
	Vucevic D. and Pesic B	The Pathophysiology Practicum and The Pathophysiology Workbook,Beograd, Libri Medicorum	2009	
Additional literature				
	Author/s	Publication title/Publisher	Year	Pages (from-to)
Student responsibilities.	Grading policy		Points	Percentage
	Pre-exam activities			

types of student assessment and grading	Activities during lectures	10	10%
	Practical work	20	20%
	colloquium	10	10%
	Seminar paper	10	10%
	Final exam		
	Practical exam	10	10%
	Written exam	40	40%
	TOTAL	100	100 %
Certification date	June 17th 2024		