

Course unit title	Code
PATHOLOGY (for medical students)	PAT02115

Lecturer(s)	Department(s)
Coordinating: assoc. prof. dr. Justinas Besusparis	Vilnius university, Faculty of
Others: prof. dr. Arvydas Laurinavicius, prof. dr. Virginija Grabauskienė,	Medicine, Department of Pathology,
assoc. prof. dr. Aušrinė Barakauskienė, assoc. prof. Violeta Kvedarienė,	Forensic Medicine and
junior assist. Tomas Baltrūnas, assist. Vaida Baltrūnienė, lect. Ugnius	Pharmacology, M. K. Čiurlionio g.
Mickys, lect. Julius Drachneris, lect. Rūta Barbora Grinevičiūtė, lect. Artūras	21, Vilnius
Barkus, junior assist. Aušra Garnelytė, assist Augustinas Baušys, lect. Ignė	
Pilvelienė.	

Cycle	Level of the course unit	Type of the course unit
Cycle (integrated studies)		Compulsory
Mode of delivery	Period of delivery	Language of instruction
Face-to-face	4 and 5 <sup>th</sup> semesters	English

Prerequisite	es and corequisites
Prerequisites:	Corequisites (if any): no
A student must have completed the following	
courses: human anatomy, histology, physiology,	
biochemistry, genetics, microbiology, immunology.	

Number of ECTS credits allocated to the course unit	Total student's workload hours	Contact hours	Self-study hours
10 credits	264	132	132

	Purpose	of	the	cou	irs	e	unit		
-						-	-	-	

To provide the students with principles of pathology, necessary for clinical medicine. Three main competences are to be developed: 1) understanding the causes and mechanisms of the diseases; 2) knowledge of special organ pathology; 3) skills of diagnostic and clinical judgement in relation to pathology features of a disease.

Learning outcomes of the course unit	Teaching and learning	Assessment methods		
	methods			
Professional qualities: to act fairly and according to ethical obligations, apply good medical practice principles at work, be emphatic, to think critically and self-critically, be creative, take the initiative, to communicate with others	Lectures, seminars and practical tasks, analysis of clinical cases	Continuous assessment of theoretical knowledge and practical skills		
Professional activities: to make an assessment within the scope of one's competence and, if necessary, ask for help, to act in new situations and adapt to them, to act independently, to solve problems, to make judgements, to work with specialists of other fields.	Lectures, seminars and practical tasks, analysis of clinical situations	Continuous assessment of theoretical knowledge and practical skills		
To identify and assess pathology features and mechanisms of diseases; to understand the development of laboratory, biochemical, immunological, cytological and morphological alterations in diseased tissues of clinical importance; select relevant tests and interpret their results; evaluate diagnostic process and	Lectures provide insights into essential knowledge on the topic and focus on principles of understanding pathology findings of clinical relevance. The lectures (including recordings) are available in	Continuous assessment of theoretical knowledge and practical skills: quiz in writing, solutions to didactic clinical situations.		

	1	M		
disease treatment on the basis of pathological	digital format and can be	Main method of assessment		
knowledge.	viewed at the VU learning	<u>Cumulative points:</u>		
	environment.	CP =10X%+30Y%+60Z% =100%		
		<b>X</b> – continuous assessment during seminars and practical tasks		
		Y – interim control (test, colloquium)		
		$\mathbf{Z}$ – final control (test, examination)		
Application of evidence-based medical	Lectures, seminars and	Continuous assessment		
principles, skills and knowledge: to use	practical tasks	theoretical knowledge and		
scientifically-based evidence in practice, to	-	practical skills		
search for the relevant literature, critically		1		
assess published medical literature				
Efficient use of information and information technologies in medical practice: properly and completely keep and store medical documentation, use computers, search for sources of literature, store and update information	Lectures, seminars and practical tasks	Continuous assessment theoretical knowledge and practical skills		
Ability to apply scientific principles, methods	Lectures, seminars and	Continuous assessment		
and knowledge in medical practice and	practical tasks	theoretical knowledge and		
research: to apply scientific principles, methods		practical skills		
and knowledge in medical practice and research		-		

		Co	ntact	wor	k ho	urs		Т	ime and tasks of self-study
Topics	Lectures	Consultations	Seminars	Practice	Laboratory work	Practical training	Total contact hours	Self-study	Tasks
			IV	SEN	<b>MES</b>	ГЕІ	R		
1. Introduction to pathophysiology. PF			3				3	2	What is pathophysiology? What is the rationale for studying pathophysiology? Health and disease. Medical history of pathophysiology. General pathology. General etiology. General pathogenesis. The concept of vicious circle. The cell as a unit of health and disease.
2. Introduction to Pathology. Pathologic accumulations. Amyloidosis. Cell and tissue regeneration and adaptive changes.	2		3				5	4	Role of pathology in clinical medicine. Tissue-based diagnosis, methods and principles. Amyloidosis, amyloid, detection, types. Paraproteinemias. Hyalinosis. Steatosis. Obesity. Cholesterol accumulations. Pathologic calcifications. Pigment accumulations. Hemosiderosis, local and systemic. Pathology of compensation and adaptation mechanisms. Hypertrophy. Hyperplasia. Regeneration. Atrophy. Epithelial / stromal interaction, architectural tissue rearrangements. Metaplasia. Dysplasia. Sclerosis.
3. Injury of the cell and tissue. Hemodynamic disorders.			3				3	4	Mechanism and causes of cellular injury. Reversible and irreversible cellular injury. Apoptosis. Necrosis. Types of necrosis, macroscopic and histology features. Outcomes of necrosis. Postmortem changes in the tissues. Damage of the connective tissue. Hyperemia, active and passive. Edema.

						Stasis. Infarction. Embolism.
4 Machanisms of call injury and	2	2		5	4	Thrombosis. Hemorrhage.
4. Mechanisms of cell injury and	2	3		3	4	mechanisms of cell injury and death.
						Sequence of events in cell damage:
						reversible and irreversible cell injury.
						Cell death: apoptosis, necrosis, necrontosis other pathways of cell death
						Types of apoptosis, pro-apoptotic and
						anti-apoptotic proteins, diseases due to
						impaired regulation of apoptosis. The
						the common causes and mechanisms of
						cell injury and death: hypoxia, ischemia,
						endoplasmic reticulum stress, DNA
						damage, oxidative stress and etc.
						mitochondrial dysfunction.
5. Inflammation.	2	3		5	4	Biological significance. Acute
Immunopathology	-	5		5	•	inflammation, mechanisms,
minunopuniology.						morphology. Mediators of inflammation.
						Types of exudate. Outcomes of acute inflammation Eactors affecting healing
						Chronic inflammation. Granuloma.
						Granulomatous diseases.
						Concept of immunopathology.
						(hypersensitivity reactions)
6. Pathophysiology of	2	3		5	5	Definition, causes and general features of
inflammation. Cellular and		-		-	-	inflammation. Pathophysiology of acute
molecular basis of inflammatory						inflammation: local and systemic effects.
mechanisms. PF						recruitment, phagocytosis, Destruction
						of the pathogen, NET's. Leukocyte-
						mediated tissue injury. Mediators of
						inflammation: vasoactive amines,
						and chemokines, complement system,
						other mediators. Acute phase response.
						Pathogenesis of fever. The mechanisms
						of thermoregulation. Diagnostic tests and inflammatory markers. The course of
						inflammatory response; potential
						complications. Pathophysiology of
						chronic inflammation. Cells and
						role of macrophages: classical and
						alternative activation.
7. Neoplasia. Principles of	2	3		5	4	Definitions of neoplasia. Etiology and
tumour pathology diagnosis						pathobiology of the tumours.
						malignant tumors. Premalignant lesions.
						Malignant transformation. Intratumour
						heterogeneity. Interaction between the
						host and the tumor. Anti-tumour
						progression. Predictive tissue pathology
						biomarkers
8. Neoplasia. Molecular		3		3	5	Cancer genes. Genetic lesions in cancer:
carcinogenesis. PF						mutations and epigenetic alterations.
						The hallmarks of cancer: self-sufficiency
						in growth signals, insensitivity to
						growth-inhibitory signals, altered
						cellular metabolism, evasion of
						sustained angiogenesis, invasion and
						metastasis, evasion of immune
						surveillance. Epithelial mesenchymal
						of tumor on host Paraneoplastic
						syndromes.

9. Hypoxemia, hypoxia.   2   3   5   4   Definition and Existication of hypoxia information and existication of hypoxia information, increased in hypoxemia, item ways in hypoxia information, increased and hypoxemia information in hypoxemia information, increased and hypoxemian informatin hypoxemianterim information, increased andinophypox			r			-		
Oxidative stress. PF   PF     Oxidative stress. PF   PF     Image: Stress of the	9. Hypoxemia, hypoxia.	2		3		5	4	Definition and classification of hypoxia:
10. Pathophysiology of shock syndrome. PF     3     3     3     3     Review of states sequences and adjevent activity of states and interview.       10. Pathophysiology of shock syndrome. PF     3     3     3     Review of states activity of states and states activity of states.     3     3     3     Review of states activity of states.       11. Pathophysiology of problem     3     3     3     4     Hypermits activity of states.     3     4       12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF     3     5     5     4     Endothelian activity optications and activity and betterior and activity activity of states.     3     4     Hypermits activity of states.     3	Oxidative stress. PF							nypoxic, anemic, circulatory, histotoxic
10. Pathophysiology of shock syndrome. PF     3     3     3     Review of stressed and theorem and the transmission and theorem and the								humovamia: low avugan prossure in
10. Pathophysiology of shock syndrome. PF     3     3     3     3     Review of stress: response. Petential endicates: free radicates: the radicates in various organs during ethoric hypotes and ethorized stress response (RGS). Ways of generation of precise (RGS). Ways of generation of radicates: free radicates: the radica								inspired air hypoventilation increased
10. Pathophysiology of shock syndrome. PF 3 3 3 3 3 3 3 3 7 Review of stress resource of the syntamics to hypoxia. Accumulation of oxygenetic oxygen species (ROS). Ways of generation of free radicals. Pathopic effects of ROS. cell injury and detain. Lipid periodiation in ordinal. NNA kisions. Removal of free radicals. Firmary, secondary and terinary attributions.   10. Pathophysiology of shock syndrome. PF 3 3 3 8 Review of stress response. Potential effects of prolonged and severe stress. Definition, classification and eitology of shock simparies (and stress resource) atoms syndrome. Pathophysiology of shock simparies (and stress resource) atoms stress and thrombosis. PF   11. Pathophysiology of pathophysiology of atherosclerosis. PF 2 3 5 4 Fadothelium as an andoctine-parceline atherosclerosis. PF, fielding, pathogenesis of production of antaryses, sortic dissection of caracterian in the regulation of vascular reactivity of input-term in blood vascular reactivity regulation of an ascular reactivity regulation of antaryses, sortic dissection of stress ather series in thromotexis. The role of caddhelium in the regulation of an antaryses, sortic dissection of antaryses, sortic dissection of antaryses, sortic dissection of antaryses, sortic dissection of antary								alveolar arterial gradient. Compensatory
10. Pathophysiology of shock 3 3 3 3 4 The role of Hyposit-indicable factor in various organs during choice klypoxia. Accumulation of oxygen-derived feer andicable. There and cables a transformation of membranes conduting and letting and the choice of the provide and the modification of models. Finding and the choice of the provide and the modification of models. Finding and the choice of the provide and the modification of models. Finding and the provide and the modification of models. Finding and the provide and the pro								and adaptive mechanisms to hypoxia
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10. Pathophysiology of shock syndrome. PF 3 3 3 Review of stess response. Potential endetsk: reactive oxygen species (ROS). Ways condary and tertitiv and cath. Diph peroxidation in membranes: oxidative modification of proteins. DNA lesions. Removal of free maticals. Pinnay, secondary and tertitiv and cath. Diph peroxidations.   10. Pathophysiology of shock syndrome. PF 3 3 Review of stess response. Potential effects of prolonged and seves stess. Definition and existing and existing to hock. Impured this every mechanism and existing to hock. Impured this every mechanism and stages of thock. Complications of stock. RES, DK, multinering severity of isheenis. Prof. Influencing severity of isheenis. Hemostasis and thrombosis. PF   12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF 2 3   13. Heart pathology 3 3 4   14. Hart pathology 3 3 5 4   13. Heart pathology 3 3 3 4								organs during chronic hypoxia
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10. Pathophysiology of shock syndrome. PF 3 3 3 3 Review of stress response. Potential environments and stratuments and the stress response. Potential environments and stratuments and the stress response. Potential environments and stratuments and the stress response. Potential environments environments and the stress response. Potential environments environment environments and the environment environment environment enviro								species (ROS). Ways of generation of
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10. Pathophysiology of shock syndrome. PF 3 3 3 Review of stress response. Potential effects of prolonged and severe stress. Definition, classification and eriology of shock: impaired insue oxygenation; compersatory mechanisms and stages of shock. Complications of shock: ARDS, DBC, multingen dysfunctions of shock: ARDS, DBC, multingen dysfunction syndrome.   11. Pathophysiology of peripheral blood flow. Hemostasis and thrombosis. PF 3 4 Appremia. Comparison of shock: ARDS, DBC, multingen dysfunction, syndrome.   12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF 2 3 5 4 Review of stress and endotes and platest and interiod. Complexity and platest and interiod. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF   12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF 2 3 5 4 Review and an endothelial dysfunction. Pathophysiology of atherosclerosis. PF   13. Heart pathology 3 3 4 Startischerosclerosis. PF 3   13. Heart pathology 3 3 4 Congenitation intervincion, lack of information and multicontion. Production of cultored hild of information and injury.   13. Heart pathology 3 3 4 Congenitation intervincions. Pathophysic of anterosclerosis. PF								cell injury and death. Lipid peroxidation
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10. Pathophysiology of shock syndrome. PF   3   3   3   3   3   Review of stress response. Potential effects of prolonged and severe stress. Definition, classification and etiology of shock syndrome. Pathophysiology of shock syndrome. Pathophysiology of shock complications of shock: ABDS.     11. Pathophysiology of peripheral blood flow. Hernostasis and thrombosis. PF   3   4   Hyperennia, congestion, ischemia, Hernostasis and thrombosis. Hyperoaugulable states: acquired and inhericel. Etiology, and pathogenesis of pulmonary artery thromboembolism. The pathogenesis of Dismental intravascular caugulation schemanics. PF     12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF   2   3   5   4   Endothelian as endocrine-paracritic impainment in blood vessel function, lack of cogan. The relation provide syndrome of and bedress and platetter equation of vascular caugulation schemanisms. Bleeding disorders due to endothelial dysfunction. Pathophysiology of atherosclerosis. PF   2   3   5   4   Endothelian as an endocrine-paracritic Endothelial dysfunction of vascular pathogenesis and complexitor of vascular thromostics. The robothelial dysfunction of anti- thrombotic molecular properties and functions: the notherial carculation of anti- thrombotic molecular properties and functions: the robothelial dysfunction of anti- thrombotic molecular properties and function.     13. Heart pathology   3   3   4   Congenial neurosclerosis. The pathogenesis of endothelial proferation, ipid infinitation, cause.   3   4     13. Heart pathology								radicals. Primary, secondary and tertiary
10. Pathophysiology of shock syndrome. PF   3   3   3   Review of stress response. Potential effects syndrome. PIG     11. Pathophysiology of peripheral blood flow.   3   3   4   Review of stress response. Potential expression and etiology of shock: impairing tissue oxygenation; compensatory mechanisms and stages of block. Complications of shock: ARDS, DC, multiorgan dysfunction syndrome.     11. Pathophysiology of peripheral blood flow.   3   3   4   Hyperential, congestion. ischemia. Hemostasis and thrombosis. PF     12. Endothelial dysfunction.   2   3   5   4   Endothelian functions of anonymethol states: acquirate and intrombosits. A precental and venous thrombosin. By systemic thromboembolism, my systemic thromboembolism, my systemic thromboembolism, s								antioxidants.
syndrome, PF   a   a   a   b   a   b   a   b   a   b   a   b <t< td=""><td>10. Pathophysiology of shock</td><td></td><td></td><td>3</td><td></td><td>3</td><td>3</td><td>Review of stress response. Potential</td></t<>	10. Pathophysiology of shock			3		3	3	Review of stress response. Potential
1. Pathophysiology of peripheral blood flow.   3   3   4   Hyperemia, congestion, ischemia, temostasis and thrombosis. PF     1. Pathophysiology of peripheral blood flow.   3   4   Hyperemia, congestion, ischemia, temostasis and thrombosis. Hypercoagulable states: acquired and inherited. Etiology and pubogenesis of pulmonary artery thromboembolism. The pathogenesis of Diseminated intravascular coagulation impairment inblood vessel function, lack of coagulation factors and platelet pathogy. Etiology, pathogenesis and complexitions of aneurysms, aoric dissection.     12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF   2   3   5   4   Endothelial mass an endocrine-paracrite problemations endothelian of aneurysms, aoric dissection.     12. Endothelial dysfunction. Pathophysiology of atherosclerosis. PF   2   3   5   4   Endothelial mass an endocrine-paracrite problemation of vascular bomostasis. Endothelial endothelian of aneurysms, aoric dissection.     13. Heart pathology   3   3   4   Congenital heart defects: with shurt information and vascular reactivity. Types of anteriosclerosis. The production of aneursms of endothelian injury. Types of anteriosclerosis. The probabilization of aneursms of anelothelial injury. Types of anteriosclerosis. The production of aneursmin endothelial injury. Types of anteriosclerosis. The production of aneursms of endothelian injury. Types of anteriosclerosis. The production of aneursmin of endothelian injury. Types of anteriosclerosis. The production of anti-tool of andothelian injury. Types of anteriosclerosis. The production of aneurseleroscleros	syndrome. PF							effects of prolonged and severe stress.
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						(transposition of main arteries, Fallot tetrad); obstructive (aortic coarctation, pulmonary venous atresia, common arterial trunk). Heart valve defects: degenerative; rheumatism and rheumatic heart disease, infectious endocarditis. Hypertensive heart disease. Ischemic heart disease; myocardial infarction, chronic coronary insufficiency.
14. Pulmonary pathology	2	3		5	4	Lung tumors, histological types. Interstitial pneumonia and pneumonitis (sarcoidosis, usual interstitial pneumonia, non-specific interstitial pneumonia, desquamative pneumonia). Adult respiratory distress syndrome. Bronchitis, chronic. Pulmonary tuberculosis. Bronchoectasis.
15. The Female Genital Tract pathology. Pathology of Pregnancy and Breast.		3		3	4	Cervical cancer. HPV infection. Cervical intraepithelial neoplasia. PAP test, Bethesda categories. Prevention of cervical cancer. Endometriosis. Adenomiosis. Endometrial hiperplasia. Endometrial carcinoma. Myometrila tumors. Ovarian cysts and tumours. Fibrocystic changes. Proliferative disease with and without atypia. Breast carcinoma: ductal / lobular in situ carcinoma, ductal / lobular invasive. Stromal and fibroepithelial tumors.
16. Pathophysiology of systemic blood flow. PF	2	3		5	5	Types and causes of hypertension. The pathogenesis of essential hypertension: changes in blood vessel tone, increased vascular resistance, increased blood volume. Complications of hypertension. Heart failure. The concepts of cardiac output, preload, afterload, ejection fraction. Causes and pathogenesis of systolic and diastolic heart failure. Neurohumoral activation as one of the key mechanisms underlying the progression of heart failure. The role of increased sympathetic nervous system and RAAS activation, elevated production of ANP, BNP and cytokines. Pathophysiology and types of myocardial hypertrophy: eccentric and concentric. Causes and pathogenesis of acute and chronic heart failure. Pathophysiology-based heart failure. The pathophysiology of primary and secondary pulmonary hypertension. Cardiomyopathies. Inflammatory cardiomyopathy.
17. Obesity and metabolic syndrome. Pathophysiology of diabetes. PF		3		3	4	The etiology and pathogenesis of obesity. Neurohumoral regulation of energy balance and body weight. Brain- gut axis: the role of leptin, insulin, ghrelin, PYY, GLP-1, cholecystokinin. The role of adipokines. Comorbidities of obesity. The role of visceral obesity in the pathogenesis of essential hypertension, coronary heart disease, stroke, cancer, non-alcoholic fatty liver disease and type II diabetes. Metabolic syndrome. The role of microbiome in the pathogenesis of obesity. Classification of diabetes mellitus. Secondary diabetes. Pathogenesis of diabetes. Obesity and insulin resistance. Impaired glucose tolerance. Acute

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							complications of diabetes: hypoglycemia, diabetic ketoacidosis, hyperosmolar hyperglycemic nonketotic coma. Long-term complications of diabetes: micro-and macroangiopathy, neuropathy, infections, cataract. The pathogenesis of long-term complications: the role of advanced- glycation products (AGE), protein kinase C activation, and disturbances in polyol pathways.
18. Disorders of fluid and electrolyte balance. PF	2	3			5	4	The regulation of body fluid homeostasis: regulation of extracellular fluid volume and plasma osmolality. The concept of plasma tonicity. Negative and positive fluid balance. Causes, pathogenesis and complications of dehydration and hyperhydration. The etiology ant pathogenesis of hypo and hypernatremias. The consequences of rapid changes in sodium levels. The etiology and pathogenesis of the inappropriate antidiuretic hormone secretion syndrome (SIADH) and diabetes insipidus. Causes of edema: impaired venous return, arteriolar dilation, reduced plasma oncotic pressure, lymphatic obstruction, sodium retention, inflammation. Pathophysiology of electrolyte imbalance: potassium, calcium, magnesium.
19. Pathophysiology of acid- base balance disorders. PF		3			3	5	Maintenance of constant serum pH. Buffering systems: bicarbonate-carbonic acid buffer, phosphate buffer, protein buffer. Respiratory and renal regulation of acid-base balance. The pathophysiology of acid-base balance disorders. Causes and effects of acidosis and alkalosis. Respiratory and metabolic acidosis. The concept of anion gap. Respiratory and metabolic alkalosis. Chloride responsive and chloride resistant metabolic alkalosis. Compensation for acid-base disorders. Mixed acid-base balance disorders. Arterial blood gas analysis parameter (pH, pCO <sub>2</sub> , HCO <sub>3</sub> <sup>-</sup> ) interpretation.
20. Vasculitis and thrombotic microangiopathies		3			3	4	Classification of vasculitis. Giant cell (temporal) arteriitis. Kawasaki syndrome. Polyarteriitis nodosa. ANCA vasculitis. Microscopic poliangiitis. Wegener's granulomatosis. Churg- Strauss syndrome. Leukocytoclastic vasculitis. Cryoglobulinemic vasculitis. Henoch-Schonlein purpura. Pulmorenal syndromes. Thrombotic microangiopathies. Antiphospholipid antibody syndrome. Progressive systemic sclerosis. Hemolytic uremic syndrome. Thrombotic thrombocytopenic purpura. Pathology of atherosclerosis. Aortic aneurysms.
21. Pathophysiology of the hematopoetic and lymphoid system. PF		3			3	4	Red cell disorders. Classification of anemias according to the underlying mechanism, reticulocyte index and red cell morphology. Anemia of blood loss, etiology, pathogenesis, compensatory mechanisms. Hemolytic anemias, their types. Anemia of diminished erythropoiesis, its etiology and pathogenesis. Iron deficiency anemia, anemia of chronic inflammation, aplastic anemia. Pathophysiologic classification of polycythemia. White cell disorders.

						Differential leukocyte count, types and causes of leukocytosis. Causes and pathogenesis of leukopenia. Neoplastic white cell proliferation, classification. Acute leukemias, pathophysiology, general symptoms.
22. Leukaemias and lymphomas	2	3		5	6	Enlarged lymph node: clinical and pathology algorithm of diagnosis. Histological patterns and differential diagnostics of reactive lymphadenopathy. Hodgkin's and non- Hodgkin's lymphomas in Lithuania and the World (WHO classification). Hodgkin's lymphoma. The most common B non-Hodgkin lymphomas: Diffuse large B cell lymphoma; B Follicular lymphoma; B mantle cell lymphoma; B small lymphocytic lymphoma/leukemia; B marginal zone lymphoma (extranodal).
23. Pathophysiology of the gastrointestinal system and liver. PF	2	3		5	4	Pathophysiology of nausea and vomiting; Esophageal achalasia: etiology and pathophysiology. Gastroesophageal reflux disease (Barrett esophagus): etiology, pathophysiology. Gastric cancer: etiology; pathophysiology; complications. Dumping syndrome: etiology; pathophysiology. Jaundice: classification; etiology; pathophysiology. Viral hepatitis (A, B, C, D): etiology; pathophysiology; serology markers. Liver cirrhosis: etiology; pathophysiology; complications (portal hypertension; hepatic encephalopathy; liver insufficiency; hepatorenal syndrome; hepatopulmonary syndrome. Acute and chronic pancreatitis: etiology; pathophysiology. Gut microbiome, its role in health and disease.
24. Liver pathology		3		3	3	Wilson disease. Hepatorenal syndrome. Portal hypertension syndrome. Alfa-1 antitrypsin deficiency. Autoimmune hepatitis. Hemochromatosis. Viral hepatitis (A, B, C, D, E). Toxin-induced liver disease. Circulatory disorders. Liver tumors. Primary biliary cirrhosis. Alcoholic liver disease. Hepatic failure. Cirrhosis. Homeostasis disorders.
25. Gastrointestinal pathology		3		5	5	Esophagitis. Barrett esophagus. Esophageal tumors. Congenital esophageal abnormalities. Gastritis. Gastric polyps. Helicobacter pylori infection. Acute gastric ulcers. Gastric adenocarcinoma. Neuroendocrine tumors. Pancreatic adenocarcinoma. Ischemic bowel disease. Infectious enterocolitis. Achalasia. Malabsorbtion syndromes. Acute appendicitis. Tumors of the appendix. Peritoneum pseudomyxoma. Diverticular disease of the colon. Pseudomembranous colitis. Gastrointestinal lymphomas. Adenomatous lesions of colon. Colorectal cancer. Ulcerative colitis. Crohn disease. Hirschprung disease. Mallory-Weiss syndrome. Celiac disease. Whipple disease.
26. Renal pathology		3		3	5	Structural and functional aspects and clinico-pathologic correlations in

							"medical" kidney diseases. Principles
							and methods of renal biopsy pathology evaluation. Patterns of renal and glomerular injury. Minimal change disease and the concept of podocytopathies. Focal and segmental
							glomerulosclerosis, primary and secondary. Membranous glomerulopathy. Diabetic
							glomerulosclerosis. Amyloidosis. Paraprotein deposition. Acute postinfectious (diffuse endocapillary
							proliferative) glomerulonephritis, Rapidly progressive (crescentic and/or necrotising) glomerulonephritis: anti- GBM, ANCA, immune-complex mediated. Membranoproliferative glomerular injury: Immune complex-
							mediated, cryoglobulinemic, dense deposit disease, C3-glomerulonephritis, immunoglobulin light chain deposition, glomerular involvement in thrombotic angiopathies. Mesangioproliferative glomerular injury: InA perheparathy
							Henoch-Schoenlein purpura. Lupus nephritis. Amyloid AL, light chain nephropathy, immunotactoid glomerulopathy, myeloma kidney, tubulopathies. Alport syndrome, thin
							glomerular basement membrane disease, Fabry disease, nephronophthisis/ medullary cystic disease, polycystic kidney disease. Acute tubular necrosis, renal oxalosis, myeloma kidney, interstitial nephritis analossic
							nephropathy, reflux nephropathy.
27. Pathophysiology of the endocrine system. PF		3			3	5	Common traits of endocrine disease etiology and pathogenesis. Control of endocrine gland activity. Pathophysiology of hypothalamic- pituitary axis. Etiology and pathogenesis of pituitary gland diseases: hypopituitarism, pituitary gigantism, acromegaly, Cushing disease. Etiology and pathogenesis of hyperprolactinemia. Adrenocortical hyperfunction: hypercortisolism, primary and secondary aldosteronism, adrenogenital syndromes. Adrenocortical insufficiency: etiology and pathogenesis of Addison disease. Thyroid disorders: goiter, hyperthyroidism, hypothyroidism. Etiology and pathogenesis of parathyroid glands: hyper and hypothyroidism.
28. Pathology of the endocrine system	2	3			5	4	Parathyroid gland: hyperplasia, adenoma, carcinoma. Functioning neuroendocrine tumors: gastrinoma, insulinoma, somatostatinoma, glucagonoma. Neuroendocrine tumours
							of gastrointestinal tract and pancreas. Nodular and diffuse goiter. Graves disease. Thyroiditis. Thyroid tumours: adenoma, papillary carcinoma, follicular carcinoma, medullary carcinoma, undifferentiated carcinoma. Adrenal tumours: adenoma, carcinoma, pheochromocytoma. Functioning adrenal tumours.
29 Pathophysiology of the	2	 3		<u> </u>	5	3	The pathophysiology of
nervous system. PF					5	5	neurodegenerative diseases. The concept of proteinopathies. The role of misfolded protein aggregation, mitochondrial dysfunction, oxidative stress in the

							pathogenesis of neurodegenerative diseases (Alzheimer disease, frontotemporal dementia, Parkinson's disease, Huntington disease, amyotrophic lateral sclerosis, prion diseases). Cerebrovascular diseases: the pathophysiology of ischemic stroke, intracranial hemorrhages. Cerebral amyloid angiopathy.Etiology and pathogenesis of brain edema. Diseases of myelin. The pathogenesis of multiple sclerosis, acute disseminated encephalomyelitis,
30. Pathology of central nervous system.			3		3	4	Brain infarction. Tumors of the brain: glial tumors (pilocytic astrocitoma, diffuse astrocitoma, anaplastic astrocitoma, glioblastoma, oligodendroglioma, anaplastic oligodendroglioma), meningioma, meduloblastoma, metastatic tumors. Molecular classification of glial tumors.
31. Urological pathology	2		3		5	4	Urothelial tumors. Testicular tumors: germinogenic tumors: seminoma, yolk sack tumor, embrionic carcinoma, choriocarcinoma. Prostatic adenocarcinoma. Renal cell carcinoma: clear cell, papillary, chromophobe. Renal oncocytoma and papillary adenoma.
32. Skin diseases	2		3		5	4	Skin histology and terminology describing major microscopic changes. General principles of inflammatory dermatoses: psoriasis. Infectious dermatoses: verrucae (warts).General principles of blistering (bullous) disorders: pemphigus vulgaris. Melanocytic tumors: ABCDE criteria system, melanocytic nevi, melanomas.Malignant neoplasms of the epidermis: basal cell carcinoma, squamous cell carcinoma.Cutaneous T lymphoma (mycosis fungoides).
33. Colloquia		4					
Total hours	32		100		132	132	

Assessment strategy	Weight	Assessme	Assessment criteria	
	(%)	nt period		
Main method of assessment <u>Cumulative points:</u> <b>CP =10X%+30Y%+60Z%</b> <b>=100%</b> <b>X</b> –_continuous assessment of active participation during seminars and practical tasks <b>Y</b> – stage control (test, colloquium) <b>Z</b> – final control (test, aramination)	X10% Y30%	During seminars During semester	Continuous assessment of active partic The participation in the seminars is of to take Pathology exam if at least 80% both semesters have been attended interactive questions are provided as of The questions have to be answered particular time limit. In case of a p question 1 point is given, otherwise The percentage of positive responses both semesters and summarized as to (X) and comprises 10% of the Cumul	cipation during seminars. bligatory. One is eligible % of the seminars during l. During each seminar open questions or MCQs. during the seminar in a positive response to the - zero points are gained. is calculated throughout he student activity score ative Points.
examination)	Z60%	At the end of pathology course.	A total of 4 interim assessment tests (during the 4 <sup>th</sup> and 5 <sup>th</sup> semesters. knowledge and skills evaluation, obta classes and by self-study. A percenta calculated. The tests are provided appointed time. If sound and docur provided before the test) prohibits a st the time appointed, 1 test during the without impact to the cumulative score test is estimated at zero score. The craare accomplished if a student has according to the end of both semesters are award taking the examination (Z) test. Final examination is based on a writtee test lasts approximately 2 hours and u total. The tests are computerized, aim skills evaluation. Final grade is calculated from the CP intervals: Cummulative points, % >10.00 >20.00 >30.00 >40.00 >60.00 >65.00 >65.00	colloquia) are carried out The tests are aimed at ained during the practical age of correct answers is only once and at the mented reason (must be student to take the test at e course can be skipped e. In other cases, a missed edits for the 4 <sup>th</sup> semester umulated at least 50% of t 70% from the 2 Y tests e of X and Y tests at 92% led 10 final score without en (computer) test. The to 120 questions in ed at knowledge and based on following the Final grade 1 2 3 4 5 6 7
			>75.00	8
			>85.00	9
			>90.00	10

Author	Year of publi catio n	Title	No of periodica l or vol. of publicati on	Publication place and publisher or Internet link
Required reading				
Vinay Kumar Abul Abbas Jon Aster	2020	Robbins Pathology		Elsevier, 10th edition and other editions: <u>https://www.clinicalkey.com</u> / <u>#!/browse/book/3-s2.0-</u> <u>C20160040871?indexOverri</u> <u>de=GLOBAL</u>
Recommended reading				
Copstead L-EC, Banasik JL.	2018	Pathophysiology,6/E		Saunders/Elsevier
Gary D. Hammer, Stephen J. McPhee	2020	Pathophysiology of Disease: An Introduction to Clinical Medicine, 8e		https://accessmedicine.mhme dical.com/book.aspx?bookI D=2468
Stevens A, Lowe J, Scott I.	2009	Core Pathology,3/E,		Morsby/Elsevier