PATHOLOGICAL PHYSIOLOGY

PATHOLOGICAL BASIS OF THE DISEASE

THIRD YEAR OF STUDIES

School year 2024/2025

Course unit:

PATHOPHYSIOLOGY

The subject is evaluated with 16 ECTS. There are 7 hours of active classes per week (3 hours of lectures and 4 hours of work in a small group).

TEACHERS:

	Name and surname	E-mail	Title
1	Aleksandar Djukic	adjukic@sbb. rs	Full professor
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COURSE STRUCTURE:

Module	**Name of the module**	**week**	**Lectures weekly**	**Work in a small group per week**	**Head of the module**
1	General pathophysiology	14	3	4	prof. dr Olgica Mihaljevic
2	Special pathophysiology	16	3	4	Prof.dr Nemanja Zdravkovic
					Σ 90+120=210

EVALUATION:

The student masters the subject in modules. The grade is equivalent to the number of points earned (see tables). Points are earned in two ways:

ACTIVITY DURING THE LESSON: In this way, the student can earn up to 50 points:

A. Oral examination: in a special part of the exercise, he answers one questions from that week of classes and, in accordance with the demonstrated knowledge, earns 0–0.5 points (up to 15 points in total)

B. Tests by modules: in this way, a student can gain up to 35 points (70 questions, each question on the test is valued at 0.5 points)

FINAL WRITTEN EXAM: In this way, the student can gain up to 50 points (50 questions, each worth 1 point). A student has the right to take the final written exam if he has achieved more than 50% of the points provided for the activity and test in the modules. Postponed passing of the final written exam (in the following exam periods) does not reduce the number of points used to define the final grade.

The final grade is formed as follows:

In order to pass the course, the student must pass the modules and the final written exam.
To pass the module the student must:
1. obtains more than 50% points in that module
2. acquires more than 50% of the points provided for the activity in teaching in each module
3. pass the module test, i.e. have more than 50% correct answers.

The number of points earned	Grade
0 - 50	**5**
51 - 60	**6**
61 - 70	**7**
71 - 80	**8**
81 - 90	**9**
91 - 100	**10**

TESTS BY MODULES

MODULE 1

FINAL TEST

0-16 POINTS

EVALUATION OF THE FINAL TEST
The test has 32 questions
Each question is worth 0.5 points

MODULE 2

FINAL TEST

0-19 POINTS

EVALUATION OF THE FINAL TEST
The test has 38 questions
Each question is worth 0.5 points

Literature

1. **PATHOPHYSIOLOGY: THE BIOLOGIC BASIS FOR DISEASE IN ADULTS AND CHILDREN, EIGHTH EDITION by Kathryn L. McCance and Sue E. Huether, 2019.**

2. **ROBBINS & COTRAN PATHOLOGIC BASIS OF DISEASE, TENTH EDITION INTERNATIONAL EDITION, 2021.**

   available from: https://worldofmedicalsaviours.com/mbbs-pdf-books/

All lectures are available on the website of the Faculty of Medicine: www.medf.kg.ac.rs

THE PROGRAM

FIRST MODULE: GENERAL PATHOPHYSIOLOGY

TEACHING UNIT 1:

INTRODUCTION TO PATHOPHYSIOLOGY

3 hours of lectures	exercises+seminar: 4 hours
Introduction to pathophysiology. Subject of pathophysiology. Etiology and pathogenesis of the disease. Pathophysiological mechanisms of adaptive cell changes and cell injury mechanisms (free radicals and hypoxia) **The student should know:** What Pathophysiology studies • Definitions of health and disease • What is the etiology and pathogenesis of the disease (with examples); • What are the symptoms and what are the signs of the disease • Mechanisms of adaptive cell changes (atrophy, hypertrophy, hyperplasia and dysplasia) • Mechanisms of reversible and irreversible cell damage	**Introduction to pathophysiology.** Etiology and pathogenesis of diseases - examples. Mechanisms of cell adaptation and cell response to injury. Cell death. **The student should know:** • Meaning of etiology and pathogenesis • Definition of the disease and its stages • Adaptive cell changes (atrophy, hypertrophy, hyperplasia and dysplasia) • The difference between apoptosis and necrosis

TEACHING UNIT 2:

BIOLOGICAL ETIOLOGY FACTORS. INFLAMMATION AND INFECTION.

3 hours of lectures	exercises+seminar: 4 hours
Biological etiological factors. Inflammation. Acute and chronic inflammation. Systemic changes in inflammation. Infection. **The student should know:** • Definition of inflammation, etiology and pathogenesis of acute inflammatory reaction • Definition and etiopathogenesis of infection • Course and outcome of infection • Systemic host response to infection (fever, changes in plasma proteins, blood elements, erythrocyte sedimentation rate) • Definition, etiology and pathogenesis of the syndrome systemic inflammatory response • Definition, etiology and pathogenesis of sepsis	**Inflammation.** Acute and chronic inflammation. Vascular, cellular and metabolic changes in inflammation. Mediators of the inflammatory reaction. Fever. **The student should know:** • The difference between inflammation and infection • The difference between acute and chronic inflammation • Stages of the inflammatory reaction • Local and systemic changes in inflammation • Pathophysiological basis and mechanism of origin fever

TEACHING UNIT 3:

DISORDERS OF NON-SPECIFIC AND SPECIFIC PROTECTION OF THE ORGANISM.

3 hours of lectures	exercises+seminar: 4 hours
Etiopathogenesis of disorders of non-specific i specific protection of the organism. Disorders non-specific immunity: phagocyte function disorders and complement system disorders. Disorders of specific immunity: immunodeficiencies (primary and secondary) **The student should know:** • The most important disorders of non-specific immunity (phagocyte and complement system functions) • The most important disorders of specific immunity (B and T lymphocytes)	**Disorders of non-specific i specific protection of the organism.** Interpretation of laboratory findings in disorders of non-specific and specific protection of the organism. The most common congenital and acquired immunodeficiencies. **The student should know:** • Pathogenesis of non-specific body protection disorders • Pathogenesis of inborn immunodeficiency • Most commonly acquired immunodeficiency

TEACHING UNIT 4:

HYPERSENSITIVITY REACTIONS AND AUTOIMMUNE REACTIONS

3 hours of lectures	exercises+seminar: 4 hours
Ethiopathogenesis of hypersensitivity reactions and autoimmune reactions. **The student should know:** • Differences between terms: allergy, atopy, anaphylaxis, hypersensitivity reactions • Pathogenesis of four types of hypersensitivity reactions • Mechanisms of establishment of autotolerance and emergence of autoimmunity • Etiopathogenesis of organ-specific and organ-non-specific autoimmune diseases	**Hypersensitivity reactions:** Anaphylactic, cytotoxic, immunocomplex and late type hypersensitivity reaction. Autoimmune reactions with examples of autoimmune diseases. **The student should know:** • Definition and classification of hypersensitivity reactions • Pathogenesis of certain types of reactions hypersensitivity • To distinguish anaphylactic from anaphylactoid reactions • To distinguish certain types of reactions hypersensitivity, citing clinical examples

TEACHING UNIT 5:

LOCAL AND SYSTEMIC CIRCULATION FUNCTION DISORDERS.

3 hours of lectures	exercises+seminar: 4 hours
Local and systemic functional disorders circulation. Pathophysiological mechanisms of shock, multiple organ dysfunction syndrome and multiple organ insufficiency syndrome. **The student should know:** • Disturbance of local and systemic circulation functions • Definition, types and mechanism of shock, multiple organ dysfunction syndrome and multiple organ insufficiency syndrome	**Disturbances of local circulation function.** Arterial and venous hyperemia; ischemia syndrome; thrombosis and embolism; lymphatic circulation disorders. **The student should know:** • Pathophysiological mechanisms of local circulation disorders • The difference between arterial and venous hyperemia • The difference between thrombosis and embolism

TEACHING UNIT 6:

MECHANICAL AND PHYSICAL ETIOLOGY FACTORS.

3 hours of lectures	exercises+seminar: 4 hours
Mechanical and physical etiological factors. Local and general mechanical injuries. Hyper- and hypothermia. Etiopathogenesis of burns and frostbite. The effect of electric current on the organism. **The student should know:** • Types and mechanisms of occurrence of local and general mechanical injuries • Etiology and pathogenesis of blast and crash syndrome • Mechanisms of injuries caused by physical etiological factors (electric current, atmospheric pressure, gravity and acceleration, motion sickness).	**Mechanical and physical etiological factors.** The concept of wounds - mechanisms of formation and types of wounds. General mechanical injuries - blast and crash syndrome. Etiopatogenesis of burns and frostbite. **The student should know:** • Definition and types of wounds • The difference between concussion and contusion • Etiopathogenesis of blast and crash syndrome • Definition and stages of burns and frostbite • Pathogenesis of burn disease

TEACHING UNIT 7:

DISORDERS OF HOMEOSTASIS. GENERAL ADAPTATION SYNDROME

3 hours of lectures	exercises+seminar: 4 hours
Homeostasis disorders. General adaptation syndrome. **The student should know:** • The theory of general adaptation syndrome (OAS) • What are stressors: external and internal • The body's response to the effects of stressors, as well as changes in the body in acute stress • Phases of acute stress • The role of stress in disease pathogenesis	**General adaptation syndrome**- The body's response to the effects of stressors **The student should know:** • Definition of general adaptation syndrome • Phases of the general adaptation syndrome • The role of stress in the development of diseases with examples

TEACHING UNIT 8:

CHEMICAL ETIOLOGY FACTORS.

3 hours of lectures	exercises+seminar: 4 hours
Disorders caused by the action of chemical etiological factors (endotoxins and exotoxins). Endogenous and exogenous intoxication. **The student should know:** • How does intoxication occur (endogenous and exogenous) • Basic principles of the detoxification process • Examples of intoxications (exogenous and endogenous)	**Endogenous and exogenous intoxications.** Ways of entry of exotoxins into the body; mechanism of action of toxins. Stages of biotransformation of xenobiotics. Acute and chronic poisoning. **The student should know:** • How intoxications occur • The difference between endogenous and exogenous intoxication • Mechanisms of biotransformation of toxins in the liver (detoxification and bioactivation) • Pathophysiological mechanisms of origin

	the most important endogenous and exogenous intoxications • The difference between acute and chronic poisoning

TEACHING UNIT 9:

DISORDERS OF WATER AND ELECTROLYTE METABOLISM PART I

3 hours of lectures	exercises+seminar: 4 hours
Disorders of water and electrolyte metabolism I. Etiopathogenesis of edema. Disorders of water, sodium and chloride metabolism. Disorders of potassium metabolism. **The student should know:** • Disorders of fluid distribution in the body and its distribution by compartment • Etiopathogenesis of sodium and chlorine balance disorders (isotonic, hypertonic and hypotonic disorders) • Etiopathogenesis and clinical consequences hyperkalemia and hypokalemia	**Disorders of water and electrolyte metabolism I.** Water and electrolyte balance in the body. Etiopathogenesis of hyper- and hyponatremia. Etiopathogenesis of edema. Hemodynamically, oncodynamic, angiomural and lymphodynamic type of edema. Transudate and exudate. **The student should know:** • Mechanisms of metabolic disorders of water, sodium and chlorine. • Definition and division of edema • The difference between transudate and exudate.

TEACHING UNIT 10:

DISORDERS OF WATER AND ELECTROLYTE METABOLISM PART I

3 hours of lectures	exercises+seminar: 4 hours
Disorders of water and electrolyte metabolism II. Disorders of calcium, phosphate and metabolism of magnesium. Functional disorders parathyroid glands. **The student should know:** • Etiology and pathogenesis of functional disorders parathyroid glands • Causes and mechanism of the most important disorders of calcium, phosphate and magnesium metabolism	**Disorders of water and electrolyte metabolism II.** Etiopathogenesis of hyper- and hypocalcemia. Etiopathogenesis of hyper and hypophosphatemia. Metabolic disorders of magnesium. **The student should know:** • Mechanisms of metabolic disorders of calcium, phosphate and metabolism of magnesium • Clinical consequences of electrolyte metabolism disorders

TEACHING UNIT 11:

ACID-BASE BALANCE

3 hours of lectures	exercises+seminar: 4 hours
Acid-base balance disorders. **The student should know:** • Basic mechanisms of acid-base balance maintenance (buffer systems, respiratory system, kidneys, bones) and acid-base balance disorders • To differentiate terms: acidosis, acidemia, alkalosis, alkalemia • Etiology and pathogenesis of metabolic disorders of acid-base balance • Etiology and pathogenesis of respiratory disorders of acid-base balance	**Disorders of acid-base balance.** Maintaining pH constancy in the body isohydria. Balance disorders: metabolic and respiratory acidosis; metabolic and respiratory alkalosis. Clinical consequences of pH balance disorders. **The student should know:** • The difference between metabolic and respiratory acidosis • The difference between metabolic and respiratory alkalosis • To recognize certain acid-base disorders

	balance (by analyzing clinical examples)

TEACHING UNIT 12:

VITAMINS AND OLIGOELEMENTS

3 hours of lectures	exercises+seminar: 4 hours
Disorders of vitamin metabolism (hypovitaminosis and hypervitaminosis). Disorders of the metabolism of oligoelements. **The student should know:** • Etiopathogenesis and consequences of hypervitaminosis and hypovitaminosis • Etiopathogenesis of metabolic disorders oligoelements	**Disorders of vitamin metabolism (hypovitaminosis and hypervitaminosis). Disorders of the metabolism of oligoelements.** **The student should know:** •Pathophysiological consequences of the lack of water soluble and liposoluble vitamins • Disorders of iron metabolism

TEACHING UNIT 13:

DISORDERS OF THE METABOLISM OF ORGANIC MATTER: CARBOHYDRATES AND FATS

3 hours of lectures	exercises+seminar: 4 hours
Disorders of carbohydrate metabolism. Etiopathogenesis of hyperglycemia and hypoglycemia. Fat metabolism disorders. Atherosclerosis. **The student should know:** • Definition, division and etiopathogenesis of diabetes • Definition, division and etiopathogenesis of the hypoglycemic state • Types of fat metabolism disorders (digestion and absorption disorders, blood fat concentration disorders, lipidosis)	**Disorders of the metabolism of organic substances.** Laboratory diagnosis of disorders carbohydrate and fat metabolism. Clinical consequences of metabolic disorders of organic matter. **The student should know:** • Can interpret OGTT results and differentiate prediabetes state from diabetes mellitus. • Master the lipidogram analysis in diagnostics disorders of fat metabolism.

TEACHING UNIT 14:

DISORDERS OF THE METABOLISM OF ORGANIC MATTER: PROTEIN. DISORDERS OF ENERGY METABOLISM

3 hours of lectures	exercises+seminar: 4 hours
Disorders of protein metabolism. Quantitative and qualitative disorders of protein metabolism. Selective disorders of plasma proteins**. Energy balance disorders.** Starvation. Obesity. **The student should know:** • Basic disorders of protein metabolism • Definition and classification of enzymopathies • The importance of determining the concentration of enzymes in the blood in laboratory diagnostics • Definition and etiopathogenesis of starvation/obesity	**Disorders of the metabolism of organic substances.** Laboratory diagnosis of disorders protein metabolism. Clinical consequences of disorders of protein metabolism of organic substances. **The student should know:** • Knows the laboratory analyzes used in diagnosis of phenylketonuria and homocystinuria. • Etiopathogenesis and the consequences of starvation/obesity

SECOND MODULE: SPECIAL PATHOPHYSIOLOGY

TEACHING UNIT 15:

PATHOPHYSIOLOGY OF THE RESPIRATORY SYSTEM

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the respiratory system. Lung ventilation disorders (obstructive and restrictive). Gas diffusion disorders through the alveolo-capillary membrane. Pulmonary perfusion disorders. Pulmonary edema. Respiratory insufficiency. **The student should know:** • Etiology and pathogenesis of lung ventilation disorders (obstructive and restrictive) • Etiology and pathogenesis of gas diffusion disorders through the alveolo-capillary membrane • Etiology and pathogenesis of pulmonary disorders circulation • Etiology and pathogenesis of respiratory insufficiency	**Pathophysiology of the respiratory system**. Obstructive and restrictive lung ventilation disorders. The methods of functional examination of lung disorders- spirometry. Gas analysis. **The student should know:** • Etiology and pathogenesis of lung ventilation disorders (obstructive and restrictive) • Spirometry characteristics in different lung ventilation disorders • Correct blood sampling for gas analysis and interpretation of the obtained results

TEACHING UNIT 16:

CARDIOVASCULAR SYSTEM PART I

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the cardiovascular system part I: Ischemic heart disease. Disorders of the function of the pericardium, myocardium and endocardium. Clinical consequences of certain disorders of the cardiovascular system function. **The student should know:** • Mechanisms of occurrence and clinical consequences of heart defects • Definition and etiopathogenesis of rheumatic fever • Etiopathogenesis of pericardial disease (acute and chronic pericarditis) • Etiopathogenesis of ischemic heart disease	**Pathophysiology of the cardiovascular system. Pathological ECG.** **The student should know:** • Basic elements of ECG recording - determination rhythm, frequency, heart axis, presence hypertrophy and signs of ischemia • Features of ischemic heart disease on ECG record

TEACHING UNIT 17:

CARDIOVASCULAR SYSTEM PART II

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the cardiovascular system, part II: disorders of the function of arteries, veins and lymphatic vessels. Arterial hypertension and hypotension. **The student should know:** • Pathophysiological basis of diseases of the aorta (aneurysm) and peripheral arteries (occlusive and functional disorders) • Pathophysiological basis of venous diseases (varicose veins, thrombophlebitis, and chronic venous	**Pathological ECG part two.** Heart rhythm disorders - impulse generation disorders (nomotopic and heterotopic disorders) and impulse conduction disorders (bradyarrhythmias and tachyarrhythmias). Blood pressure measurement. **The student should know:** • To recognize the type of arrhythmia by analyzing the ECG records • Correctly measure and interpret arterial blood pressure values

insufficiency) and lymphatic vessels (lymphangitis, lymphadenitis, and lymphedema) • Etiopathogenesis of arterial hypertension • Etiopathogenesis of arterial hypotension	

TEACHING UNIT 18:

PATHOPHYSIOLOGY OF THE HEMATOPOEIOUS SYSTEM I

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the hematopoietic system, part I. Disorders of hematopoiesis. Anemias: definition and classification. Aplastic anemia. Sideropenic anemia. Megaloblastic anemia. Hemolytic anemia. **The student should know:** • Definition and division of anemia • Etiology and pathogenesis of aplastic anemia • Consequences of vitamin V12 and folic acid deficiency (especially: megaloblastic anemia) • Etiology and pathogenesis of sideropenic anemias • Etiology and pathogenesis of hemolytic anemias	**Pathophysiology of the hematopoietic system.** The process of making cells from a stem cell. Mechanisms of cell differentiation regulation. Anemia definition and division. Clinical manifestations of anemia. Laboratory diagnosis and differentiation of anemia**.** **The student should know:** • Clinical consequences of anemia • Compensatory mechanisms in the occurrence of anemia • To distinguish anemia based on laboratory tests findings (cell counts, hemoglobin values, etc.) hematocrit, feremia, and erythrocyte indices)

TEACHING UNIT 19:

PATHOPHYSIOLOGY OF THE HEMATOPOEIOUS SYSTEM II

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the hematopoietic system II. Leukemias - acute and chronic. Disorders of hemostasis - hemorrhagic syndrome; thrombosis**.** **The student should know:** • Definition, etiology and pathogenesis of leukemia • Division of leukemia • Basic mechanisms of coagulation disorders (bleeding, thrombosis, DIK) • Basic tests to determine existence certain disorders of hemostasis	**Pathophysiology of the hematopoietic system II.** Laboratory characteristics and clinical consequencesof leukemia and hemostasis disorders. **The student should know:** • to correctly interpret the leukocyte formula • to distinguish the types of leukemia based on hematological preparations • to knows the eiopathogenesis of hemostasis disorders

TEACHING UNIT 20:

PATHOPHYSIOLOGY OF THE URINARY SYSTEM

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the urinary system. Renal function disorders - pre-renal, renal and post-renal. Vascular renal diseases. Glomerular and tubulointerstitial renal diseases. Obstructive uropathy. Renal insufficiency - acute and chronic.	**Pathophysiology of the urinary system.** Urinary syndrome - analysis of urine samples. Determination of physical and chemical characteristics urine. Urine sediment. Functional tests of the urinary system (renal clearance).

The student should know: • Pathophysiological bases and consequences of the disorder renal functions - prerenal, renal and postrenal • Etiology and pathogenesis of acute and chronic renal insufficiency • To differentiate between certain types of acute renal injury insufficiency, as well as acute versus chronic renal insufficiency	**The student should know:** • That on the basis of urine analysis, he can distinguish individuals diseases of the urinary tract • To know the elements of urine sediment and their pathophysiological importance • To know the method of determining renal function clearance and their pathophysiological significance, as well as to interpret the obtained results

TEACHING UNIT 21:

PATHOPHYSIOLOGY OF THE GASTROINTESTINAL TRACT

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the gastrointestinal system. Esophageal function disorders. Disorders of the secretory and motor function of the stomach. Disorders of the function of the small intestine (maldigestion and malabsorption). Colon function disorders. Acute and chronic pancreatitis. **The student should know:** • Etiology and pathogenesis of the most important disorders esophageal functions • Etiology and pathogenesis of ulcer disease • Etiology and pathogenesis of inflammatory bowel diseases (Crohn's disease and ulcerative colitis) • Etiology and pathogenesis of constipation and diarrhea • Definition, division and etiopathogenesis of ileus	**Pathophysiology of the gastrointestinal system and pancreas.** Disorders of gastric secretion - etiopathogenesis of hypersecretion and hyposecretion. Acute and chronic pancreatitis. **The student should know:** • Etiology, pathogenesis and clinical consequences gastric hyposecretion and hypersecretion • The role of laboratory diagnostics (determination values of amylase and lipase in serum) in the diagnosis of pancreatitis

TEACHING UNIT 22:

PATHOPHYSIOLOGY OF THE HEPATOBILIARY TRACT

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the hepatobiliary system. Etiopathogenesis of hepatitis. Etiopathogenesis of jaundice. Metabolic diseases and liver tumors. Liver insufficiency. **The student should know:** • Etiopathogenesis of hepatitis • Etiopathogenesis of metabolic liver diseases • Etiology and pathogenesis of liver failure	**Pathophysiology of the hepatobiliary system.** Icterus - prehepatic, hepatic and posthepatic type. Laboratory diagnosis of icterus. **The student should know:** • To differentiate between certain types of icterus based on laboratory results (bilirubinemia, presence/absence bilirubin in urine and stool, transaminase values, prothrombin time...).

TEACHING UNIT 23:

ENDOCRINE SYSTEM PART I

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the endocrine system I. Physiological basis of functioning of the endocrine system. Hormones-secretion, transport and mechanism of action. Feedback mechanisms. Hormonal imbalance. **The student should know:** • Physiological basis of endocrine functioning system and its interaction with the nervous and immune systems • Definition and classification of endocrinopathies • The most common causes of hyperfunction and hypofunction endocrine glands	**Pathophysiology of the endocrine system I.** Basic principles of functioning of the endocrine system. Hormonal imbalance - hyper and hypofunction of endocrine glands. **The student should know:** • to know the feedback system • to distinguish primary, secondary and tertiary endocrinopathy • to know the laboratory characteristics and pathophysiological consequences of endocrine hyper- and hypofunction

TEACHING UNIT 24:

ENDOCRINE SYSTEM PART II

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the endocrine system II. Dysfunction of the hypothalamus and pituitary gland. Diseases of the thyroid gland. Parathyroid gland function disorders. Adrenal diseases. **The student should know:** • Pathophysiological basis and clinical consequences dysfunction of the hypothalamus, pituitary, thyroid and parathyroid and adrenal glands.	Hyperfunction and hypofunction of endocrine glands. Laboratory diagnostics of endocrine gland disorders Basal and dynamic tests. **The student should know:** • To interpret the results of laboratory analyses which are used in diagnostics of dysfunction of the pituitary gland, hypothalamus, thyroid, parathyroid and adrenal glands • To interpret the results of suppression tests and stimulation in the diagnosis of certain endocrine gland function disorders

TEACHING UNIT 25:

NERVOUS SYSTEM PART I

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the nervous system part one. Mediators of neuronal cell death. Neuromuscular diseases. Pathophysiology of the neuromuscular synapse. **The student should know:** • Etiology and pathogenesis of the most important muscular and neuromuscular diseases • Definition and etiopathogenesis of myasthenia gravis	**Pathophysiology of the central nervous system.** Functional tests of the central nervous system system. Signs of peripheral and central motoneuron damage. Examination of reflexes. Disorders of motility and sensibility. **The student should know:** • The difference between symptoms and signs of peripheral and central motoneuron damage • Reflex test technique • Proper use of monofilament

TEACHING UNIT 26:

NERVOUS SYSTEM PART II

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the nervous system, part two. Autoimmune diseases of the peripheral and central motor neuron. Diseases of myelin. Neurodegenerative diseases. akinetic-rigid syndrome. Dementia. **The student should know:** • Definition and etiopathogenesis of multiple sclerosis • Pathophysiological basis of Parkinson's disease • Pathophysiological basis of Alzheimer's disease	**Pathophysiology of the central nervous system II.** Functional tests of the central nervous system system. Examination of physical and chemical characteristic of cerebrospinal fluid. **The student should know:** • Basic characteristics and method of collection cerebrospinal fluid • Physical and chemical characteristics of cerebrospinal fluid in diagnosis of CNS diseases - cerebrospinal fluid syndrome

TEACHING UNIT 27:

PATHOPHYSIOLOGY OF THE SENSES

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the senses. Diseases of the optical apparatus. Disorders of the auditory conduction system. Etiopathogenesis of smell disorders. Disorders of the sense of taste. **The student should know:** • Etiology and pathogenesis of the most common disorders refraction of light in the eye • Etiology and pathogenesis of glaucoma and cataracts • Etiology and pathogenesis of changes in color vision. • Etiology and pathogenesis of functional disorders optical conduction system and vision center. • Etiology and pathogenesis of the most common damages inner ear and vestibular apparatus • Etiology and pathogenesis of the most common disorders of the sense of smell and taste.	**Pathophysiology of the senses**. Examination of the disorders of the optical apparatus. Examination of the disorders of the auditory conduction system. **The student should know:** • Etiopathogenesis of the diseases of the sence • to correctly interpret the results of tympanometry and distinguish conductive from perceptive deafness • to know the technique of checking visual acuity

TEACHING UNIT 28:

AGING

3 hours of lectures	exercises+seminar: 4 hours
Aging. Definition and theories of aging. Characteristics of the aging process. **The student should know:** • Definition of aging and theories about the origin of the aging process	**Aging.** Disorders of organs and organ systems in the elderly **The student should know:** • To interpret dysfunctions individual organs and organ systems (hematopoietic, respiratory, cardiovascular, gastrointestinal, urinary, endocrine and nervous) in the elderly persons.

TEACHING UNIT 29:

PATHOPHYSIOLOGY OF THE SKIN AND CONNECTIVE TISSUE

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of skin and connective tissue. Systemic connective tissue diseases. Rheumatoid arthritis. Systemic lupus erythematosus. Systemic sclerosis. Sjogren's syndrome. polymyositis, Dermatomyositis. Systemic vasculitis. **The student should know:** • Causes and mechanism of primary i secondary skin lesions • Definition and etiopathogenesis of systemic connective tissue diseases	**Pathophysiology of systemic connective tissue diseases tissues.** Definition and classification of diseases connective tissue. Laboratory diagnostics rheumatoid arthritis and systemic erythema lupus. **The student should know:** • Basic principles of laboratory diagnostics of rheumatoid arthritis and the importance of "rheumatoid factor" • Basic principles of systemic diagnostics lupus erythematosus - antinuclear (ANA) antibodies and LE cells.

TEACHING UNIT 30:

PATHOPHYSIOLOGY OF LOCOMOTOR SYSTEM

3 hours of lectures	exercises+seminar: 4 hours
Pathophysiology of the locomotor system (bones, joints and muscles). Metabolic bone diseases - osteoporosis, osteopenia, osteomalacia, rickets, Paget's disease. Inflammation of bone tissue. Bone fractures and fracture healing. **The student should know:** • Etiopathogenesis of osteoporosis, osteomalacia, osteoarthritis and osteomyelitis • Bone fracture healing mechanisms	**Pathophysiology of the locomotor system.** Etiopathogenesis of osteoporosis, osteomalacia, osteoarthritis and osteomyelitis. Laboratory findings in the disorders of the locomotor system. **The student should know:** • to distinguish osteopenia from osteoporosis • to knows the etiopathogenesis of bone metabolic disorders • to correctly interprets laboratory results obtained by examining the musculoskeletal system

LECTURE SCHEDULE

Hall on the 8th floor of UCCK

MONDAY

08:30 - 10:45

SEMINAR SCHEDULE

MONDAY	
R32	**R33**
11:15 – 14:15 **group I**	**11:15 – 14:15** **group II**

SCHEDULE OF EXERCISES

TUESDAY	
R32	**R33**
13:50 – 15:20 **group I**	**13:50 – 15:20** **group II**

LESSON SCHEDULE FOR THE SUBJECT PATHOPHYSIOLOGY

module	week	type	Method unit name	Teacher
1	1	**L**	Introduction to pathophysiology	Olgica Mihaljevic
1	1	**S**	Introduction to pathophysiology	Olgica Mihaljevic Ivica Petrovic (standby: Nemanja Zdravkovic)
1	1	**E**	Introduction to pathophysiology	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
1	2	**L**	Biological etiological factors. Inflammation and infection.	Vladimir Jurisic
1	2	**S**	Biological etiological factors. Inflammation and infection.	Vladimir Jurisic Ilija Jeftic (stanby: Olgica Mihaljevic)
1	2	**E**	Biological etiological factors. Inflammation and infection.	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
1	3	**L**	Disorders of non-specific and specific protection of the organism	Vladimir Jurisic
1	3	**S**	Disorders of non-specific and specific protection of the organism	Vladimir Jurisic Ivica Petrovic (standby: Olgica Mihaljevic)
1	3	**E**	Disorders of non-specific and specific protection of the organism	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)
1	4	**L**	Hypersensitivity reactions and autoimmune reactions	Nemanja Zdravkovic
1	4	**S**	Hypersensitivity reactions and autoimmune reactions	Nemanja Zdravkovic Ilija Jeftic (standby: Vladimir Jurisic)
1	4	**E**	Hypersensitivity reactions and autoimmune reactions	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)

LESSON SCHEDULE FOR THE SUBJECT PATHOPHYSIOLOGY

module	week	type	Method unit name	Teacher
1	5	**L**	Disturbances of the function of local and systemic circulation, shock and MODS	Ivica Petrovic
1	5	**S**	Disturbances of the function of local and systemic circulation, shock and MODS	Ivica Petrovic Olgica Mihaljevic (standby: Aleksandar Djukic)
1	5	**E**	Disturbances of the function of local and systemic circulation, shock and MODS	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
1	6	**L**	Mechanical and physical etiological factors	Olgica Mihaljevic
1	6	**S**	Mechanical and physical etiological factors	Olgica Mihaljevic Aleksandar Djukic (standby: Ilija Jeftic)
1	6	**E**	Mechanical and physical etiological factors	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
1	7	**L**	Homeostasis disorders. General adaptation syndrome.	Olgica Mihaljevic
1	7	**S**	Homeostasis disorders. General adaptation syndrome.	Olgica Mihaljevic Ilija Jeftic (standby: Vladimir Jurisic)
1	7	**E**	Homeostasis disorders. General adaptation syndrome.	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
1	8	**L**	Chemical etiological factors	Vladimir Jurisic
1	8	**S**	Chemical etiological factors	Vladimir Jurisic Olgica Mihaljevic (standby: Ivica Petrovic)
1	8	**E**	Chemical etiological factors	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
1	9	**L**	Disorders of water and electrolyte metabolism, part I	Ilija Jeftic

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module	week	type	Method unit name	Teacher
1	9	**S**	Disorders of water and electrolyte metabolism, part I	Ilija Jeftic Nemanja Zdravkovic (standby: Olgica Mihaljevic)
1	9	**E**	Disorders of water and electrolyte metabolism, part I	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
1	10	**L**	Disorders of water and electrolyte metabolism, part II	Ilija Jeftic
1	10	**S**	Disorders of water and electrolyte metabolism, part II	Ilija Jeftic Ivica Petrovic (standby: Nemanja Zdravkovic)
1	10	**E**	Disorders of water and electrolyte metabolism, part II	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)
1	11	**L**	Acid-base balance disorders	Nemanja Zdravkovic
1	11	**S**	Acid-base balance disorders	Nemanja Zdravkovic Olgica Mihaljevic (standby: Aleksandar Djukic)
1	11	**E**	Acid-base balance disorders	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
1	12	**L**	Disorders of vitamins and trace elements	Nemanja Zdravkovic
1	12	**S**	Disorders of vitamins and trace elements	Nemanja Zdravkovic Ilija Jeftic (standby: Ivica Petrovic)
1	12	**E**	Disorders of vitamins and trace elements	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)
1	13	**L**	Disorder of the metabolism of organic substances: carbohydrates and fats.	Aleksandar Djukic

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module	week	type	Method unit name	Teacher
1	13	**S**	Disorder of the metabolism of organic substances: carbohydrates and fats	Aleksandar Djukic Ivica Petrovic (standby: Olgica Mihaljevic)
1	13	**E**	Disorder of the metabolism of organic substances: carbohydrates and fats	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
1	14	**L**	Disorder of protein metabolism. Disorders of energy metabolism	Olgica Mihaljevic
1	14	**S**	Disorder of protein metabolism. Disorders of energy metabolism	Olgica Mihaljevic Aleksandar Djukic (standby: Ilija Jeftic)
1	14	**E**	Disorder of protein metabolism. Disorders of energy metabolism	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
		FTM1	**FINAL TEST OF MODULE 1**	
2	15	**L**	Pathophysiology of the respiratory system.	Ilija Jeftic
2	15	**S**	Pathophysiology of the respiratory system.	Ilija Jeftic Ivica Petrovic (standby: Vladimir Jurisic)
2	15	**E**	Pathophysiology of the respiratory system.	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)
2	16	**L**	Pathophysiology of the cardiovascular system part I	Ivica Petrovic
2	16	**S**	Pathophysiology of the cardiovascular system part I	Ivica Petrovic Aleksandar Djukic (standby: Nemanja Zdravkovic)
2	16	**E**	Pathophysiology of the cardiovascular system part I	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)

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module	week	type	Method unit name	Teacher
2	17	**L**	Pathophysiology of the cardiovascular system part II	Ivica Petrovic
2	17	**S**	Pathophysiology of the cardiovascular system part II	Ivica Petrovic Aleksandar Djukic (standby: Olgica Mihaljevic)
2	17	**E**	Pathophysiology of the cardiovascular system part II	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
2	18	**L**	Pathophysiology of the hematopoietic system, part I	Vladimir Jurisic
2	18	**S**	Pathophysiology of the hematopoietic system, part I	Vladimir Jurisic Ilija Jeftic (standby: Olgica Mihaljevic)
2	18	**E**	Pathophysiology of the hematopoietic system, part I	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
2	19	**L**	Pathophysiology of the hematopoietic system, part II	Vladimir Jurisic
2	19	**S**	Pathophysiology of the hematopoietic system, part II	Vladimir Jurisic Nemanja Zdravkovic (standby: Ilija Jeftic)
2	19	**E**	Pathophysiology of the hematopoietic system, part II	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)

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module	week	type	Method unit name	Teacher
2	20	**L**	Pathophysiology of the urinary system	Ivica Petrovic
2	20	**S**	Pathophysiology of the urinary system	Ivica Petrovic Olgica Mihaljevic (standby: Vladimir Jurisic)
2	20	**E**	Pathophysiology of the urinary system	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
2	21	**L**	Pathophysiology of the gastrointestinal tract	Ilija Jeftic
2	21	**S**	Pathophysiology of the gastrointestinal tract	Ilija Jeftic Vladimir Jurisic (standby: Olgica Mihaljevic)
2	21	**E**	Pathophysiology of the gastrointestinal tract	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
2	22	**L**	Pathophysiology of the hepatobiliary tract	Vladimir Jurisic
2	22	**S**	Pathophysiology of the hepatobiliary tract	Vladimir Jurisic Ilija Jeftic (standby: Olgica Mihaljevic)
2	22	**E**	Pathophysiology of the hepatobiliary tract.	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
2	23	**L**	Pathophysiology of the endocrine system, part I	Ivica Petrovic
2	23	**S**	Pathophysiology of the endocrine system, part I	Ivica Petrovic Olgica Mihaljevic (standby: Aleksandar Djukic)
2	23	**E**	Pathophysiology of the endocrine system, part I	Milos Marinkovic Ema Jevtic (standby: Nemanja Zdravkovic)
2	24	**L**	Pathophysiology of the endocrine system, part II	Ivica Petrovic

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module	week	type	Method unit name	Teacher
2	24	**S**	Pathophysiology of the endocrine system, part II	Ivica Petrovic Aleksandar Djukic (standby: Olgica Mihaljevic)
2	24	**E**	Pathophysiology of the endocrine system, part II	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
2	25	**L**	Pathophysiology of the nervous system part I	Vladimir Jurisic
2	25	**S**	Pathophysiology of the nervous system part I	Vladimir Jurisic Nemanja Zdravkovic (standby: Ilija Jeftic)
2	25	**E**	Pathophysiology of the nervous system part I	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)
2	26	**L**	Pathophysiology of the nervous system part II	Ilija Jeftic
2	26	**S**	Pathophysiology of the nervous system part II	Ilija Jeftic Ivica Petrovic (standby: Vladimir Jurisic)
2	26	**E**	Pathophysiology of the nervous system part II	Milos Marinkovic Ema Jevtic (standby: Olgica Mihaljevic)
2	27	**L**	Pathophysiology of the senses	Olgica Mihaljevic
2	27	**S**	Pathophysiology of the senses	Olgica Mihaljevic Vladimir Jurisic (standby: Ilija Jeftic)
2	27	**E**	Pathophysiology of the senses	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
2	28	**L**	Pathophysiology of aging	Olgica Mihaljevic
2	28	**S**	Pathophysiology of aging	Olgica Mihaljevic Ivica Petrovic (standby: Nemanja Zdravkovic)

LESSON SCHEDULE FOR THE SUBJECT PATHOPHYSIOLOGY

module	week	type	Method unit name	Teacher
2	28	**E**	Pathophysiology of aging	Milos Marinkovic Ema Jevtic (standby: Ilija Jeftic)
2	29	**L**	Pathophysiology of skin and connective tissue	Nemanja Zdravkovic
2	29	**S**	Pathophysiology of skin and connective tissue	Nemanja Zdravkovic Ilija Jeftic (standby: Vladimir Jurisic)
2	29	**E**	Pathophysiology of skin and connective tissue	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
2	30	**L**	Pathophysiology of the locomotor system	Nemanja Zdravkovic
2	30	**S**	Pathophysiology of the locomotor system	Nemanja Zdravkovic Ilija Jeftic (standby: Vladimir Jurisic)
2	30	**E**	Pathophysiology of the locomotor system	Milos Marinkovic Ema Jevtic (standby: Ivica Petrovic)
		FTM2	**FINAL TEST OF MODULE 2**	
			WRITTEN EXAM	