

**MEDICAL UNIVERSITY – PLOVDIV**  
**FACULTY OF MEDICINE**

**SYLLABUS**  
**IN**  
**PATHOPHYSIOLOGY**

**Approved by the Department Council № 11 on 01. 07. 2020**

**Confirmed by the Faculty Council - Protocol №5/08.07.2020**

**Pathophysiology  
Syllabus**

Discipline	Final exam/ semester	Academic hours				Academic hours in years and semesters	
		Total	Lectures	Practices	ECTS	1 <sup>st</sup> year	
Pathophysiology	VI					1 <sup>st</sup> sem.	2 <sup>nd</sup> sem.
		105	45	60	5,3	2/2	1/2

**DISCIPLINE:**

Pathophysiology

**TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE  
REQUIREMENTS:**

Required.

**LEVEL OF QUALIFICATION:** Master (M).

**FORMS OF TRAINING:** Lecture course. Practicals. Colloquiums and MCQ testing methods. Consultations. Participation in measurements conducted at the department functional laboratories. Homework, using textbooks and manuals recommended by the department.

**YEAR OF TRAINING:** 3<sup>rd</sup> year

**DURATION OF TRAINING:** Two semesters.

**ACADEMIC HOURS:** 45 hours of lectures and 60 hours of seminar practicals.

**TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:** Presentations, seminar practicals, discussions, reports by the students

**FORMS OF EVALUATION:** Preliminary assessment of progress: oral and written examination, colloquiums, MCQs.

**EVALUATION CRITERIA:** Each semester notes are summarized

**ASPECTS OF EVALUATION CRITERIA:** Discussion participation, MCQs

**SEMESTER EXAM:** Final evaluation: MCQ test of the final examination. Written exam topics drawn from the syllabus on the day of the final exam. Oral examination.

**STATE EXAM:** Negative

**LECTURER:** Lecturer with an academic degree from the Department of pathophysiology

**DEPARTMENT:** Pathophysiology

### **ANNOTATION**

Lectures and practicals in Pathophysiology are based on the general understanding of etiology and pathogenetic theories; reactivity and resistance; basic metabolism; main dysbalance in human body functions and main pathologic processes.

Special pathophysiology lectures are based on the leading pathogenic factors and mechanisms underlying the disorders of different systems – cardiovascular, respiratory, gastrointestinal, endocrine, nervous and other systems; as well etiology and pathogenesis of leading diseases like atherosclerosis, CAD, carcinomas, obesity, diabetes mellitus, AIDS and many others.

### **BASIC AIMS OF THE DISCIPLINE**

Pathophysiology is a fundamental - applied discipline. The aim is to study the causes and mechanisms of disturbed functions in a sick person.

Based on this principle, the main goals of the training in pathophysiology at MU-Plovdiv are:

- Studying the causes, conditions and mechanisms for occurrence and development of pathological processes and diseases in human, based on the contemporary level of scientific knowledge.
- Animal modeling of pathological processes and diseases for the purpose of dynamic tracking of major units of etiology and pathogenesis. Acquisition of practical habits for experimentation and observation of laboratory animals considered with medical ethics requirements.
- Implementation of the Pathogenesis Approach in Clinical Thinking of the student to the patient through training compliant with the needs of the clinical practice.
- Clarification of the mechanisms of extreme conditions – impact of environment, stress and over-information, urbanization, etc. on the psycho-somatic behavior and the biological development of human and the study of etiology and pathogenesis of socially significant diseases. Further development of disease concepts, using advances in scientific and technical progress and molecular biology, genetic engineering, immunology and others.

**The aim is consistent with:**

- Mission and conceptions of Medical University of Plovdiv
- Scopes and credit rating of the discipline Pathophysiology (ECTS system),
- Qualification characteristics of the specialty pathophysiology

The aim is adapted to the significance and chronology of the discipline in the curriculum of medical students.

## **EXPECTED RESULTS**

### **Theoretical skills**

Knowledge about:

- ✓ Main types of pathologic processes – inflammation; fever; hypoxia; disorders of metabolism;
- ✓ To be able to recognize symptoms and syndromes; pathologic condition, pathologic process and disease
- ✓ The leading causes and conditions in main diseases;

## **Practical skills**

- ✓ Basic skills in understanding the acid base dysbalance and main groups of acidosis and alkalosis; to understand the main spirometric disorders in respiratory diseases

## **LECTURES**

### ***LECTURE № 1***

#### **HEALTH AND DISEASE**

1. Basic concept of pathophysiology
2. Health.
3. Disease. Definition.
4. Periods of disease
5. Clinical and biological death
6. Aging – an universal phenomenon. Aging changes.

### ***LECTURE № 2***

#### **PATHOPHYSIOLOGY OF CARBOHYDRATES METABOLISM**

1. Carbohydrates and insulin. Regulation
2. Hyperglycemia and hypoglycemia, types.
3. Diabetes mellitus. Definition. Classification.
4. Etiology and pathogenesis of main types of diabetes.
5. Clinical presentation and complications. Pathogenesis.

### ***LECTURE № 3***

#### **PATHOPHYSIOLOGY OF LIPID METABOLISM**

1. Disorders in digestion and absorption of lipids
2. Lipoproteins. Types, metabolism, types of hyperlipidemia
3. Atherosclerosis – pathogenesis.
4. Obesity. Pathogenetic classification. Characteristics.
5. Metabolic syndrome .

### ***LECTURE № 4***

#### **DISORDERS IN WATER BALANCE. DISORDERS OF THERMOREGULATION.**

1. Body water balance.
2. Dehydration and hyperhydration. Types. Factors.

3. Edema. Definition. Types. Pathogenic factors.
4. Thermoregulation. – characteristics.
5. Hyperthermia – central hyperthermia.
6. Fever. Etiology, pathogenesis.
7. Phases and clinical presentation of fever .

### ***LECTURE № 5***

#### **PATHOPHYSIOLOGY OF ACID BASE BALANCE**

1. General pathogenesis and classification of acid base disorders.
2. Parameters. Compensations and mechanisms.
3. Main disorders of acid base balance. Characteristics.
4. Clinical presentations of acid base disorders.

### ***LECTURE № 6***

#### **PATHOPHYSIOLOGY OF CALCIUM AND PHOSPHORUS METABOLISM**

1. Calcium and phosphorus – main characteristics.
2. Hypocalcemia.
3. Hypercalcemia – causes, complications, pathogenesis
4. Osteomalacia. Osteolysis.
5. Osteoporosis
6. Rickets. Characteristics.
7. Hypophosphatemia. Hyperphosphatemia. Causes, complications, pathogenesis

### ***LECTURE № 7***

#### **HYPOXIA**

1. Oxygen cascade – stages, parameters.
2. Hypoxia – definition, basic understanding.
3. Classification. Types of hypoxia. Characteristics.
4. Tissue hypoxia. Stages, characteristics
5. Metabolic changes and adaptations in hypoxia.

## ***LECTURE № 8***

### **REACTIVITY AND RESISTANCE. ALLERGY.**

1. Reactivity and resistance – definition, basic understanding.
2. Factors influencing the reactivity and resistance - types, characteristics
3. Allergy. Definition, basic understanding.
4. Allergy of humoral and cell-mediated types. Characteristics.

## ***LECTURE № 9***

### **INFLAMMATION**

1. Definition, basic understanding and biological importance of inflammation.
2. Classification.
3. Local clinical signs.
4. Etiology and pathogenesis of inflammation
5. Mediators and modulators of inflammation.
6. Changes in the metabolism and clinical outcome of inflammation.

## ***LECTURE № 10***

### **PATHOGENESIS OF IMPAIRED CELL GROWTH. CARCINOMAS.**

1. Neoplasia.
2. Main characteristics.
3. Etiology.
4. Basic understanding and stages.
5. Growth and development of carcinomas.

## ***LECTURE № 11***

### **PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM**

1. Nonrespiratory functions of the lungs.
2. Basic mechanisms, disturbing pulmonary functions: restrictive disorders; airway obstruction
3. Disturbed breathing control.
4. Mechanisms, responsible for disturbances in pulmonary gas exchange:
  - altered ventilation/perfusion ratio
  - disturbed alveolo-capillary gas transfer
  - alveolar hypoventilation

## ***LECTURE № 12***

### **PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM**

1. Respiratory failure – essence, types, pathogenesis.
2. Acute respiratory failure. Etiology, pathogenesis.
3. Chronic respiratory failure. Etiology, pathogenesis. Compensations.

## ***LECTURE № 13***

### **PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM**

1. Quantitative and qualitative alterations in breathing. Dyspnea.
2. Definition. Types.
3. Sleep apnea syndrome – definition, pathogenesis, types.

## ***LECTURE № 14***

### **PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM**

1. Heart failure – definition;
2. Types – etiology and pathogenesis
3. Compensatory mechanisms of the heart.

## ***LECTURE № 15***

### **CORONARY ARTERY DISEASE. ARTERIAL HYPERTENSION**

1. Coronary artery disease
2. Definition
3. Classification
4. Etiology and pathogenesis
5. Essential hypertension. Etiology and pathogenesis.
6. Secondary hypertension. Types. Pathogenesis.
7. Arterial hypertension and metabolic syndrome

## ***LECTURE № 16***

### **PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. ACUTE CIRCULATORY INSUFFICIENCY. PATHOPHYSIOLOGY OF BLOOD DISORDERS. HAEMORRHAGIC DIATHESSES.**



1. Shock - definition;
2. Types, etiology, pathogenesis ;
3. Coagulation cascade. General characteristics.
4. Etiology and pathogenesis of blood coagulation disorders – coagulopathy, vasopathy, disorders in platelets count and function.

### ***LECTURE № 17***

#### **PATHOPHYSIOLOGY OF BLOOD DISORDERS. ANEMIAS. LEUKEMIAS.**

1. Anemias – definition, essence, types.
2. Pathogenetic classification.
3. Etiology and pathogenesis of different types of anemias.
4. Leukemias. Definition.
5. Classification.
6. Etiology and pathogenesis of leukemias.

### ***LECTURE № 18***

#### **PATHOPHYSIOLOGY OF THE LIVER DISORDERS**

1. Etiology and pathogenesis of liver disorders.
2. Hepatitis – etiology and pathogenesis.
3. Liver cirrhosis – etiology and pathogenesis.
4. Functional manifestations in liver disorders:
5. Jaundice – types and characteristics.
6. Portal hypertension. Ascites.
7. Hepatic encephalopathy - pathogenesis.

### ***LECTURE № 19***

#### **PATHOPHYSIOLOGY OF THE DIGESTIVE SYSTEM**

1. Gastritis and ulcers.
2. Etiology and pathogenesis
3. Pancreatitis.
4. Etiology and pathogenesis
5. Ileus and gastro-intestinal autointoxication.

## ***LECTURE № 20***

### **PATHOPHYSIOLOGY OF THE URINARY SYSTEM**

1. Etiology and pathogenesis of kidney disorders– glomerular and tubulo-interstitial.
2. Pathogenesis of the functional syndromes in kidney diseases.
3. Acute and chronic renal failure – etiology and pathogenesis.

## ***LECTURE № 21***

### **PATHOPHYSIOLOGY OF THE ENDOCRINE SYSTEM**

1. Characteristics of endocrine disorders.
2. Hypothalamo-pituitary system disturbances.
3. Disturbances in adrenal glands function. Etiology and pathogenesis
4. Disturbances in thyroid gland function. Etiology and pathogenesis

## ***LECTURE № 22***

### **PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM**

1. Etiology and pathogenesis of nervous system disorders.
2. Disturbances in sensory and motor functions of the nervous system.
3. Pain.
4. Etiology and pathogenesis

## **PRACTICES**

### ***PRACTICAL № 1***

#### **DISORDERS OF PERIFERAL CIRCULATION.**

1. Arterial and venous hyperemia – causes, mechanism,
2. Thrombosis. Etiology and pathogenesis
3. Molecular mechanisms of thrombosis – consequences.
4. Stasis.
5. Ischemia. Infarctus. Causes, mechanism.
6. Embolism. Types.

## ***PRACTICAL № 2***

### **PATHOPHYSIOLOGY OF CARBOHYDRATES METABOLISM**

1. Impaired digestion and absorption of carbohydrates in gastrointestinal system. Hyperglycemia and hypoglycemia, types.
2. Carbohydrates and insulin. Regulation.
3. Diabetes mellitus. Definition. Classification.
4. Etiology and pathogenesis of main types of diabetes.
5. Clinical presentation and complications. Pathogenesis.

## ***PRACTICAL № 3***

### **PATHOPHYSIOLOGY OF LIPID METABOLISM**

1. Impaired digestion and absorption of lipids in gastrointestinal system. Disorders in transport of lipids
2. types of hyperlipidemia
3. Obesity. Pathogenetic classification. Characteristics.
4. Metabolic syndrome .
5. Lipoproteins. Types, metabolism, types of hyperlipidemia
6. Atherosclerosis – pathogenesis.

## ***PRACTICAL № 4***

### **PATHOPHYSIOLOGY OF PROTEIN METABOLISM**

1. Impaired digestion and absorption of proteins in gastrointestinal system. Disorders in the blood proteins.
2. Disorders of end stage protein metabolism – ammonia metabolism.
3. Disorders of purine metabolism – gout, etiology, pathogenesis.

## ***PRACTICAL №5***

### **DISORDERS IN WATER BALANCE.**

1. Body water balance.
2. Dehydration and hyperhydration. Types. Factors.
3. Edema. Definition. Types. Pathogenic factors.

## ***PRACTICAL № 6***

### **PATHOPHYSIOLOGY OF CALCIUM AND PHOSPHORUS METABOLISM**

1. Calcium and phosphorus – main characteristics.
2. Hypocalcemia.
3. Hypercalcemia – causes, complications, pathogenesis

4. Osteomalacia. Osteolysis.
5. Osteoporosis
6. Rickets. Characteristics.
7. Hypophosphatemia. Hyperphosphatemia. Causes, complications, pathogenesis

### ***PRACTICAL № 7***

#### **COLLOQUIUM**

Disorders in body metabolism (carbohydrates, lipids, proteins, water balance and calcium and phosphorus metabolism).

### ***PRACTICAL № 8***

#### **PATHOPHYSIOLOGY OF ACID BASE BALANCE**

1. General pathogenesis and classification of acid base disorders.
2. Parameters. Compensations and mechanisms.
3. Main disorders of acid base balance. Characteristics.
4. Clinical presentations of acid base disorders.
5. Diagnostic algorithms

### ***PRACTICAL №9***

#### **HYPOXIA**

1. Oxygen cascade – stages, parameters.
2. Hypoxia – definition, basic understanding.
3. Classification. Types of hypoxia. Characteristics.
4. Tissue hypoxia. Stages, characteristics
5. Metabolic changes and adaptations in hypoxia.

### ***PRACTICAL № 10***

#### **INFLAMMATION**

1. Definition, basic understanding and biological importance of inflammation.
2. Classification.
3. Local clinical signs.
4. Etiology and pathogenesis of inflammation
5. Mediators and modulators of inflammation.
6. Changes in the metabolism and clinical outcome of inflammation.

### ***PRACTICAL №11***

#### **DISORDERS OF THERMOREGULATION.**

1. Thermoregulation. – characteristics.
2. Hyperthermia – central hyperthermia.
3. Fever. Etiology, pathogenesis.
4. Phases and clinical presentation of fever .

### ***PRACTICAL № 12***

#### **PATHOGENESIS OF IMPAIRED CELL GROWTH. CARCINOMAS.**

1. Neoplasia.
2. Main characteristics.
3. Etiology.
4. Basic understanding and stages.
5. Growth and development of carcinomas.

### ***PRACTICAL № 13***

#### **COLLOQUIUM**

Main types of pathologic processes – disorders of acid-base balance, hypoxia, inflammation, fever and carcinomas).

### ***PRACTICAL № 14***

#### **REACTIVITY AND RESISTANCE. ALLERGY.**

1. Reactivity and resistance – definition, basic understanding.
2. Factors influencing the reactivity and resistance - types, characteristics
3. Allergy. Definition, basic understanding.
4. Allergy of humoral and cell-mediated types. Characteristics
5. Autoimmune response – mechanisms.
6. Immunodeficiency – types, AIDS.

***PRACTICAL № 15***

**DISCUSSION AND MCQ ON METABOLIC DISORDERS AND MAIN TYPES OF PATHOLOGIC PROCESSES**

1. Case presentation and discussion – diabetes mellitus, gout, metabolic syndrome
2. MCQ's on acid-base balance disorders.

***PRACTICAL № 16***

**PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM (PART I). FUNCTIONAL SYNDROMES OF PULMONARY DYSFUNCTION.**

1. Quantitative and qualitative alterations in breathing. Dyspnea.
2. Definition. Types.
3. Sleep apnea syndrome – definition, pathogenesis, types.
4. Pathogenetic findings in respiratory diseases – arterial hypoxia, hypercapnia, pulmonary hypertension).

***PRACTICAL №17***

**PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM (PART II). BASIC MECHANISMS, DISTURBING PULMONARY FUNCTIONS AND GAS EXCHANGE**

1. Basic mechanisms, disturbing pulmonary functions: restrictive disorders; airway obstruction
2. Pulmonary hypertension.
5. Mechanisms, responsible for disturbances in pulmonary gas exchange:
  - altered ventilation/perfusion ratio
  - disturbed alveolo-capillary gas transfer
  - alveolar hypoventilation
3. Performing and discussing a spirometry measurement of lung functions.

***PRACTICAL № 18***

**PATHOPHYSIOLOGY OF RESPIRATORY SYSTEM (PART III). RESPIRATORY FAILURE**

1. Disorders in breathing control
2. Pulmonary edema – types, pathogenesis. Белодробен оток. Видове. Патогенеза.
3. Respiratory failure – essence, types, pathogenesis.
4. Acute respiratory failure. Etiology, pathogenesis.
5. Chronic respiratory failure. Etiology, pathogenesis. Compensations

***PRACTICAL № 19***

**PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. CORONARY ARTERY DISEASE. HEART FAILURE.**

1. Compensatory mechanisms of the heart.
2. Coronary artery disease - definition
3. Classification
4. Etiology and pathogenesis
5. Heart failure – definition;
6. Types – etiology and pathogenesis

***PRACTICAL №20***

**PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. ARTERIAL HYPERTENSION**

1. Essential hypertension. Etiology and pathogenesis.
2. Secondary hypertension. Types. Pathogenesis.
3. Arterial hypertension and metabolic syndrome

***PRACTICAL №21***

**PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM. ACUTE CIRCULATORY INSUFFICIENCY.**

1. Hypotension - definition.
2. Types.
3. Shock - definition;
4. Types, etiology, pathogenesis of different types of shock;

***PRACTICAL № 22***

**PATHOPHYSIOLOGY OF BLOOD DISORDERS. ANEMIAS.**

1. Anemias – definition, essence, types.
2. Pathogenetic classification.
3. Etiology and pathogenesis of different types of anemias.

***PRACTICAL № 23***

**PATHOPHYSIOLOGY OF BLOOD DISORDERS. DISORDERS OF WHITE BLOOD CELLS. DISORDERS IN COAGULATION.**

1. Leukemias. Definition.
2. Classification.
3. Etiology and pathogenesis of leukemias.
4. Disorders in coagulation cascade.
5. Coagulopathy. Vasopathy.

***PRACTICAL №24***

**COLLOQUIUM – RESPIRATORY, CARDIOVASCULAR AND BLOOD DISORDERS**

***PRACTICAL № 25***

**PATHOPHYSIOLOGY OF THE DIGESTIVE SYSTEM**

1. Disorders in digestion and absorption in stomach.
2. Gastritis and ulcers.
3. Etiology and pathogenesis
4. Pancreatitis.
5. Etiology and pathogenesis
6. Ileus and gastro-intestinal auto-intoxication.

***PRACTICAL №26***

**PATHOPHYSIOLOGY OF THE LIVER DISORDERS**

1. Etiology and pathogenesis of liver disorders.
2. Hepatitis – etiology and pathogenesis.
3. Liver cirrhosis – etiology and pathogenesis.
4. Functional manifestations in liver disorders:
5. Jaundice – types and characteristics.
6. Portal hypertension. Ascites.
7. Hepatic encephalopathy - pathogenesis.



### ***PRACTICAL №27***

#### **PATHOPHYSIOLOGY OF THE URINARY SYSTEM**

1. Etiology and pathogenesis of kidney disorders– glomerular
2. Etiology and pathogenesis of kidney disorders–tubulo-interstitial.
3. Pathogenesis of the functional syndromes in kidney diseases.
  - edema
  - anemias
  - renal hypertension
  - urinary syndrome
  - renal osteodystrophy
4. Akute kidney injury – etiology, pathogenesis.
5. Chronic renal failure – etiology and pathogenesis.

### ***PRACTICAL № 28***

#### **PATHOPHYSIOLOGY OF THE ENDOCRINE SYSTEM**

1. Characteristics of endocrine disorders.
2. Hypothalamo-pituitary system disturbances.
3. Disturbances in adrenal glands function. Etiology and pathogenesis
4. Disturbances in thyroid gland function. Etiology and pathogenesis

### ***PRACTICAL № 29***

#### **PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM**

1. Etiology and pathogenesis of nervous system disorders.
2. Disturbances in sensory and motor functions of the nervous system.
3. Pain.
4. Etiology and pathogenesis

### ***PRACTICAL № 30***

#### **DISCUSSION AND MCQ ON DIGESTIVE AND URINARY SYSTEMS**

1. Case presentation and discussion – peptic ulcer disease, gastrites, liver cirrhosis
2. MCQ`s on digestive and urinary systems

## **Bibliography**

1. Color Atlas of Pathophysiology by Stefan Silbernag & Florian Lang; Thieme Verlag 2016
2. Handbook of Pathophysiology – Ramona Browder Lazenby, 2011 (4<sup>th</sup> edition)
3. Pathophysiology of Disease – Stephen J. McPhee, Gary D. Hammer, 2010 (6<sup>th</sup> edition), ISBN 978-0-07-162167-0
4. Essentials of Pathophysiology: Concepts of Altered Health States by Carol Mattson Porth. Lippincott Williams & Wilkins, 2006

## **Conspectus**

1. Health and disease, contemporary view of disease. Pathologic reactions, processes and conditions. General etiology and pathogenesis.
2. Reactivity and resistance. Factors, influencing reactivity and resistance. Types of reactivity and resistance.
3. Hypersensitivity reactions – types, pathogenesis. Allergies.
4. Autoimmune diseases and immunodeficient states.
5. Disturbances in peripheral circulation – arterial and venous hyperemia, ischaemia, infraction.
6. Disturbances in peripheral circulation – thrombosis and embolism.
7. Changes in blood glucose levels – hyperglycemias and hypoglycemias.
8. Diabetes mellitus – etiology, pathogenesis.
9. Diabetes mellitus – pathobiochemistry and complications.
10. Dyslipidemias – types. Atherosclerosis – risk factors, etiology, pathogenesis, consequences and complications.
11. Obesity – definition, types, pathogenesis. Metabolic syndrome.
12. Changes in the plasma proteins. Disturbances in aminoacid metabolism.
13. Disturbances in the end-stage protein metabolism – hyperazotemias.
14. Disturbances in purine metabolism – gout.
15. Disturbances in water-electrolyte balance – dehydration and hyperhydration.
16. Edemas – definition, factors for development. Types of edemas.
17. Disturbances in mineral metabolism (Ca, P, Mg). Osteoporosis and osteomalacia.
18. Disturbances in acid-base balance – general characteristics, parameters, compensations.
19. Characteristics of the main types of acid-base disorders.
20. Hypoxia – definition, parameters. Hyperoxias.
21. Pathogenetic classification of hypoxias. Characteristics of the different types.

22. Systemic, organ and cellular adaptations to hypoxia.
23. Inflammation – definition and biological meaning. Classification and outcome of inflammation. Cardinal signs of inflammation.
24. Inflammation – phases. Mediators. Vascular changes. Cellular response. Changes in metabolism.
25. Disturbances in body temperature regulation – hypo- and hyperthermia.
26. Fever – definition, etiology and pathogenesis. Significance of fever. Stages of fever. Changes in metabolism in fever. Changes in the function of organs and systems.
27. Neoplasms – general characteristic and etiology. Definition and stages of carcinogenesis.
28. Neoplasms – tumor/organism interactions. Paraneoplastic syndromes.
29. Functional pulmonary diagnostics – spirometry, diffusion capacity, lung volumes, bodyplethysmography, cardio-pulmonary exercise tests.
30. Basic mechanisms disturbing lung function – obstruction of the airflow in the airways – types.
31. Obstructive disorders. Pulmonary hyperinflation. Disturbed functional capacity. Reduced functional capacity (by CPET).
32. Basic mechanisms disturbing lung function – types of restrictive ventilatory disorders.
33. Restrictive disorders. Etiology and pathogenesis of pulmonary edema and pneumothorax.
34. Mechanisms responsible for disturbed gas exchange. Changes in the V/Q ratio, disturbed diffusion of gases through the alveolo-capillary barrier, alveolar hypoventilation syndrome, disturbances in respiratory control.
35. Acute respiratory failure – etiology, pathogenesis, types.
36. Chronic respiratory failure – etiology, pathogenesis, types.
37. Coronary artery disease – definition, types, pathogenesis.
38. Rhythm-conductive disorders. Pathogenesis.
39. Arterial hypertension – essential hypertension. Etiology, pathogenesis.
40. Secondary (symptomatic) hypertension. Hypotensions, collapse and syncope.
41. Acute insufficiency of hemodynamics – shock – definition, types, etiology, pathogenesis.
42. Heart failure - definition, etiology, pathogenesis and types. Compensatory mechanisms.
43. Functional signs of heart failure.
44. Pathogenesis of some complex symptoms. Dyspnea and fatigue.
45. Anemias – definition and classification. Posthemorrhagic anemias.
46. Anemias due to disturbed hemopoiesis. Anemias due to increased hemolysis.
47. Leukemias – definition, etiology, pathogenesis, types.

48. Disorders of hemostasis (hemorrhagic diatheses).
49. Disorders of hemostasis (thrombotic diatheses). DIC – syndrome.
50. Disorders in the gastrointestinal system. Gastritis – etiology and pathogenesis.
51. Disorders in the gastrointestinal system. Peptic ulcer – etiology and pathogenesis.
52. Pancreatitis – types, etiology, pathogenesis, complications.
53. Disorders in the gastrointestinal system: ileus, gastro-intestinal autointoxication.
- Disorders in the intestinal microbiome.
54. Basic etiology and pathogenesis of liver diseases. Hepatitis.
55. Functional signs of liver damage – jaundice, portal hypertension, ascites, hepato-renal and hepato-pulmonary syndromes.
56. Pathogenesis of liver cirrhosis. Hepatic encephalopathy.
57. Basic etiology and pathogenesis of renal disorders. Functional syndromes.
58. Etiology and pathogenesis of acute renal failure.
59. Etiology and pathogenesis of chronic renal failure.
60. Basic etiology and pathogenesis of endocrine disorders.
61. Disturbances in the functions of the pituitary gland.
62. Disturbances in the functions of the thyroid gland.
63. Disturbances in the functions of the suprarenal glands.
64. Disturbances in the functions of the gonads.
65. Basic etiology and pathogenesis of the diseases of the nervous system.
66. Degenerative diseases of the nervous system.
67. Disorders in sleep and wakefulness – hypersomnia and insomnia.
68. Disorders in sleep and wakefulness – central and obstructive sleep apnea.
69. Pain – definition, pathogenesis, types.