

Al-Farabi Kazakh National University
Higher School of Medicine
Department of Fundamental Medicine
Tasks for practical lessons of the discipline
"Normal structure and function of human body"

Practical class 1

The nervous System -The Autonomic Nervous System I

General Properties of the Autonomic Nervous System

Max grade – 2

1. *Explain how the autonomic and somatic nervous systems differ in form and function;*
2. *Explain how the two divisions of the autonomic nervous system differ in general function.*
3. *Identify the anatomical components and nerve pathways of the sympathetic and parasympathetic divisions in the picture;*
4. *Discuss the relationship of the adrenal glands to the sympathetic nervous system;*
5. *Describe the enteric nervous system of the digestive tract and explain its significance;*

Practical class 2

The nervous System -The Autonomic Nervous System II

Anatomy of the Autonomic Nervous System Autonomic Effects on Target Organs Central Control of Autonomic Function

Max grade – 2

1. *Name the neurotransmitters employed at different synapses of the ANS;*
2. *Name the receptors for these neurotransmitters and explain how they relate to autonomic effects;*
3. *Explain how the ANS controls many target organs through dual innervation;*
4. *Explain how control is exerted in the absence of dual innervation.*
5. *Describe how the autonomic nervous system is influenced by the central nervous system*

Practical class 3

The nervous System -Properties and Types of Sensory Receptor. The General Senses;

1. *Define receptor and sense organ;*
2. *List the four kinds of information obtained from sensory receptors,*
3. *Describe how the nervous system encodes each type;*
4. *Outline three ways of classifying receptors.*
5. *List several types of somatosensory receptors;*
6. *Describe the projection pathways for the general senses;*
7. *Explain the mechanisms of pain and the spinal blocking of pain signals.*

Practical class 4

The nervous System -The Sensory Organs I

The Chemical Senses—Taste and Smell

Max grade – 2

1. *Describe the receptor cells for taste and smell and identify their anatomical locations;*
2. *Identify the five primary taste sensations and the chemicals that produce them;*

3. *Discuss factors other than taste that contribute to the flavor of food;*
4. *Identify the brain regions that process gustatory and olfactory information.*

Practical class 5

The nervous System -The Sensory Organs II

Eye and Vision

Max grade – 2

1. *Describe and identify the anatomy of the eye and its accessory structures in the picture and in the model;*
2. *Discuss the structure of the retina and its receptor cells;*
3. *Explain how the optical system of the eye creates an image on the retina;*
4. *Discuss how the retina converts this image to nerve signals;*
5. *Explain why different types of receptor cells and neural circuits are required for day and night vision;*
6. *Describe the mechanism of color vision; and trace the visual projection pathways in the brain.*

Practical class 6

Histology of the nervous System -Histology The Sensory Organs. Organs of hearing and balance, taste.

1. *Describe the microscopic anatomy of the ear;*
2. *Describe the microscopic anatomy of the organ of taste.*

Practical class 7

The laws of geometric optics. Eye as an optical system

Practical class 8 The nervous System -The Sensory Organs

Hearing and Equilibrium

Max grade – 2

1. *Identify the properties of sound waves that account for pitch and loudness;*
2. *Describe the gross and microscopic anatomy of the ear;*
3. *Identify and find the structure of the ears in the model;*
4. *Explain how the ear converts vibrations to nerve signals and discriminates between sounds of different intensity and pitch;*
5. *Explain how the vestibular apparatus enables the brain to interpret the body's position and movements;*
6. *Describe the pathways taken by auditory and vestibular signals to the brain.*

Practical lesson 9

Histology The Sensory Organs Organ of sight, organ of smell.

1. *Describe the microscopic anatomy of the eye,*
2. *Describe the microscopic anatomy of the organ of smell.*

CC-1

Max grade -23

Practical class 10

The Endocrine System I

Overview of the Endocrine System

The Hypothalamus and Pituitary Gland

Max grade – 2

1. *Define hormone and endocrine system;*
2. *Name several organs of the endocrine system;*
3. *Identify the structure and lobes of the thyroid gland;*
4. *Contrast endocrine with exocrine glands; recognize the standard abbreviations for many hormones;*
5. *Describe similarities and differences between the nervous and endocrine systems.*
6. *Describe the structure and location of the remaining endocrine glands;*
7. *Name the hormones these endocrine glands produce, what stimulates their secretion, and their functions;*
8. *Discuss the hormones produced by organs and tissues other than the classical endocrine glands.*

Practical class 11

The Endocrine System II

Other Endocrine Glands

Max grade – 2

1. *Define hormone and endocrine system;*
2. *Name several organs of the endocrine system;*
3. *Identify the structure and lobes of the thyroid gland;*
4. *Contrast endocrine with exocrine glands; recognize the standard abbreviations for many hormones;*
5. *Describe similarities and differences between the nervous and endocrine systems.*
6. *Describe the structure and location of the remaining endocrine glands;*
7. *Name the hormones these endocrine glands produce, what stimulates their secretion, and their functions;*
8. *Discuss the hormones produced by organs and tissues other than the classical endocrine glands.*

Practical class 12

Histology of Endocrine System I

Microscopic Anatomy of endocrine organs and tissue

Endocrine system. Central endocrine system. Hypothalamus, pituitary, pineal gland.

Max grade – 2

1. *Describe the microscopic anatomy of portion of the endocrine system;*
2. *Describe the histology of endocrine system;*
3. *Recognize the organs of the endocrine system on their constituent tissue elements at the microscopic and ultramicroscopic levels.*
4. *Characterize the embryonic sources of development and the general laws of the structure, morphofunctional features of the organs of the endocrine system*
5. *Explain the participation of the endocrine system in the regulation of various body functions.*

Practical class 13

The Endocrine System III

Hormones and Their Actions

Max grade – 2

1. *Explain some general causes and examples of hormone hyposecretion and hypersecretion;*

2. *Briefly describe some common disorders of pituitary, thyroid, parathyroid, and adrenal function; in more detail,*
3. *Describe the causes and pathology of diabetes mellitus;*

Practical class 14

The Endocrine System IV

Endocrine Disorders.

Max grade – 2

1. *Explain some general causes and examples of hormone hyposecretion and hypersecretion;*
2. *Describe some common disorders of pituitary, thyroid, parathyroid, and adrenal function;*
3. *Describe the causes and pathology of diabetes mellitus.*

Practical class 15

Histology of Endocrine System II

Microscopic Anatomy of endocrine organs and tissue

Peripheral endocrine system. Adrenal gland, thyroid, parathyroid glands.

Max grade – 2

1. *Recognize the organs of the endocrine system on their constituent tissue elements at the microscopic and ultramicroscopic levels.*
2. *Characterize the embryonic sources of development and the general laws of the structure, morphofunctional features of the organs of the endocrine system.*

Practical class 16

Stress and Adaptation. Eicosanoids and Other Signaling Molecules

Max grade – 1

1. *Give a physiological definition of stress;*
2. *Discuss how the body adapts to stress through its endocrine and sympathetic nervous systems.*
3. *Explain what eicosanoids are and how they are produced;*
4. *Identify some classes and functions of eicosanoids;*
5. *Describe several physiological roles of prostaglandins*

Practical class 17

The Respiratory System 1-2

Anatomy of the Respiratory System. Pulmonary Ventilation

Maximum grade – 2

1. *formulate the functions of the respiratory system;*
2. *name and describe the organs of this system;*
3. *trace the air flow from the nose to the pulmonary alveoli;*
4. *connect the function of any part of the airway with its gross and microscopic anatomy.*
5. *be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;*
6. *name the respiratory muscles and describe their role in breathing;*
7. *describe the brain stem centers that control breathing and the information they receive from other levels of the nervous system;*
8. *explain how pressure gradients account for the flow of air into and out of the*

- lungs, and how these gradients are created;
9. identify sources of resistance to air flow and discuss their relationship to breathing
 10. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;

Practical class 18

Human tissue

Histology of Respiratory system: nasal cavity, trachea, bronchi, bronchioles, alveolar ducts.

Maximum grade – 2

1. Describe the main components of the conducting and respiratory parts of the system (nasal cavity, trachea, bronchi, bronchioles, alveolar ducts), structural elements, blood-brain barrier;
2. identify the structural components of the nasal cavity, trachea, bronchi, bronchioles under a microscope and microphotographs
3. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;
4. Describe the development and structure of the kidneys, renal tubules; reabsorption and secretion; renal endocrine system; urinary tract,
5. Identify the structural elements of the kidney cortex, kidney medulla, ureter, and bladder under a microscope and in microphotographs.
6. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;

CC-2 Histology CC

Max grade -10

Practical class 19

The Respiratory System 3-4

Gas Exchange and Transport. Respiratory Disorders

Maximum mark – 2

1. determine the partial pressure and discuss its relationship to a gas mixture such as air;
2. contrast the composition of the inhaled and alveolar air;
3. discuss how partial pressure affects the transport of gas by blood;
4. describe the mechanisms for transporting O₂ and CO₂;
5. what are the factors that regulate gas exchange in the lungs and systemic capillaries;
6. explain how gas exchange is regulated according to the metabolic needs of different tissues;
7. discuss the effect of blood gases and pH on the rhythm of breathing
8. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;
9. explain the significance of anatomical dead space for alveolar ventilation;
10. determine clinical measurements of lung volume and capacity;
11. determine the conditions for various deviations from the normal breathing pattern

12. describe the forms and consequences of oxygen deficiency and excess oxygen;
13. describe chronic obstructive pulmonary disease and its consequences;
14. explain how lung cancer begins, progresses, and has a lethal effect
15. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;

CC-3

Max grade -23

Practical class 20

The urinary System 1-2 Functions of the Urinary System. Anatomy of the Kidney.

Urine Formation I: Glomerular Filtration

Maximum mark – 2

1. name and locate the organs of the urinary system;
2. list several kidney functions in addition to the formation of urine;
3. describe the location and General appearance of the kidneys;
4. Determine the external and internal features of the kidneys;
5. trace the blood flow through the kidney;
6. trace the flow of fluid through the renal tubules; describe the nervous supply of the kidneys
7. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;
8. describe the process by which the kidney filters blood plasma, including the corresponding glomerular cell structure;
9. Explain the forces that promote and counteract filtration,
10. calculate the filtration pressure, taking into account the amount of these forces;
11. describe how the nervous system, hormones, and the nephron itself regulate filtration
12. be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;

ISW

Max grade -5

RK-1 Total 100

Practical class 21

The urinary System 3-4

Urine Formation II:Tubular Reabsorption and Secretion. Urine Formation III:

Water Conservation

Maximum mark – 2

1. describe how the renal tubules reabsorb useful solutions from glomerular filtrate and return them to the blood;
2. describe how the tubules secrete dissolved substances from the blood into the tubular fluid;
3. describe how the nephron regulates water excretion.
4. explain how the collecting duct and antidiuretic hormone regulate the volume and concentration of urine;

5. *explain how the kidney maintains an osmotic gradient in the kidney's brain matter that allows the collecting channel to function*
6. *be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;*
7. *explain how the collecting duct and antidiuretic hormone regulate the volume and concentration of urine;*
8. *explain how the kidney maintains an osmotic gradient in the kidney's brain matter that allows the collecting channel to function;*
9. *describe the hormonal mechanism that regulates the rate of water loss in the body to the level of hydration or dehydration*
10. *be willing and willing to learn how to be an effective team member, develop self-learning and problem-solving skills;*

Practical class 22

The urinary System 5

Urine and Renal Function Tests

Maximum mark – 2

1. *describe the functional anatomy of the ureters, bladder, male and female urethra;*
2. *explain how the nervous system and urethral sphincters control urination;*
3. *describe some of the physical and chemical properties of urine.*
4. *be willing and willing to learn how to be an effective team member, develop self-learning and problem-solving skills;*

Practical class 23

Human Tissue 9. Histology of urinary system

Maximum grade –2

1. *identify and distinguish the structural elements of the ureter, bladder under a microscope and microphotographs*
2. *be willing and willing to learn to be an effective team member, develop self-learning and problem-solving skills;*

Practical class 24

The lymphatic and immune system:

Max grade – 2

1. *List the functions of the lymphatic system;*
2. *Explain how lymph forms and returns to the bloodstream;*
3. *Name the major cells of the lymphatic system and state their functions;*
4. *Describe the structure and function of the red bone marrow, thymus, lymph nodes, tonsils, and spleen*

Practical class 25

Fluid Balance Electrolyte Balance and Acid–Base Balance

Max grade – 2

1. *Name the major fluid compartments;*
2. *List the body's sources of water and routes of water loss;*
3. *Describe mechanisms of regulating water intake and output;*
4. *List the functions of sodium and potassium;*
5. *Explain how electrolyte balance is regulated;*
6. *Describe three ways the body regulates pH.*

Practical class 26

Histology of the Lymphatic System

Cells of the lymphatic system, types of lymphatic tissue, red bone marrow, thymus, lymph nodes, tonsils, and spleen:

Max grade – 2

1. *Name the major cells of the lymphatic system; N*
2. *Name and describe the types of lymphatic tissue;*
3. *Describe the structure of the red bone marrow, thymus, lymph nodes, tonsils, and spleen*

Practical class 27

The digestive system I

General Anatomy and Digestive Processes

The Mouth Through Esophagus. The Stomach:

Max grade – 2

1. *List the functions and major physiological processes of the digestive system;*
2. *Distinguish between mechanical and chemical digestion;*
3. *Identify the basic chemical process that underlies all chemical digestion, name the major substrates and products of this process;*
4. *List the regions of the digestive tract and the accessory organs of the digestive system;*
5. *Describe the general nervous and chemical controls over digestive;*
6. *Describe the gross anatomy of the digestive tract from the mouth through the esophagus;*
7. *Identify the esophagus in the model;*
8. *Describe the composition and functions of saliva;*
9. *Describe the nervous control of salivation and swallowing.*
10. *Describe the gross anatomy of the stomach;*
11. *Identify the stomach in the model;*
12. *State the function of each type of epithelial cell in the gastric mucosa;*
13. *Identify the secretions of the stomach and state their functions;*
14. *Explain how the stomach produces hydrochloric acid and pepsin;*
15. *Describe the contractile responses of the stomach to food;*
16. *Describe the three phases of gastric function and how gastric activity is activated and inhibited.*

Practical class 28

The digestive system II

The Liver, Gallbladder, and Pancreas. The Small Intestine and Large Intestine

Max grade – 3

1. *Describe the gross anatomy of the liver, gallbladder, bile duct system, and pancreas;*
2. *Identify the liver, gallbladder, bile ducts, and pancreas in the model;*
3. *Describe the digestive secretions and functions of the liver, gallbladder, and pancreas;*
4. *Explain how hormones regulate secretion by the liver and pancreas.*
5. *Describe the gross anatomy of the small intestine;*
6. *Identify the small intestine's parts in the model, and in the picture;*

7. *State how the mucosa of the small intestine differs from that of the stomach, and explain the functional significance of the differences;*
8. *Define contact digestion and describe where it occurs; describe the types of movement that occur in the small intestine;*
9. *Describe how each major class of nutrients is chemically digested, name the enzymes involved;*
10. *Discuss the functional differences among these enzymes;*
11. *Describe how each type of nutrient is absorbed by the small intestine.*
12. *Describe the gross anatomy of the large intestine;*
13. *Summarize the functions of the large intestine;*
14. *Contrast the mucosa of the colon with that of the small intestine;*
15. *State the physiological significance of intestinal bacteria;*
16. *Discuss the types of contractions that occur in the colon;*
17. *Explain the neurological control of defecation.*

Practical class 29

Histology of digestive system I

Max grade – 2

Microscopic Anatomy of digestive organs and tissue

Digestive system. Pharynx, esophagus, stomach, small intestine, colon.

1. *Identify organs, tissues and their structural components at the microscopic level.*
2. *Describe the general plan of the structure of the hollow organs of the digestive system.*
3. *Identify esophagus, its tissue structure in the upper, middle and lower third of the esophagus.*
4. *Identify the cells of the glands of the stomach and intestinal epithelium at the microscopic and ultramicroscopic level;*
5. *Describe the microscopic anatomy of the small intestine and large intestine; describe the mucosa of the small intestine and the mucosa of the colon.*

Practical class 30

Nutrition and metabolism I

Nutrition. Carbohydrate Metabolism. Lipid and Protein Metabolism.

Max grade – 2

1. *Describe some factors that regulate hunger and satiety;*
2. *Define nutrient and list the six major categories of nutrients;*
3. *State the function of each class of macronutrients, the approximate amounts required in the diet, and some major dietary sources of each;*
4. *Name the blood lipoproteins, state their functions, and describe how they differ from each other;*
5. *Name the major vitamins and minerals required by the body and the general functions they serve.*
6. *Identify the normal indicators of the blood lipoproteins, glucose, cholesterol taking into account age, sex and individual characteristics*
7. *Define the absorptive and postabsorptive states;*
8. *Explain what happens to carbohydrates, fats, and proteins in each of these states;*
9. *Describe the hormonal and nervous regulation of each state;*

Practical class 31

Nutrition and metabolism I

Nutrition Metabolic States and Metabolic Rate Body Heat and Thermoregulation

Max grade – 2

1. *Define metabolic rate and basal metabolic rate;*
2. *Describe some factors that alter the metabolic rate;*
3. *Identify the principal sources of body heat;*
4. *Describe some factors that cause variations in body temperature;*
5. *Define and contrast the different forms of heat loss;*
6. *Describe how the hypothalamus monitors and controls body temperature;*
7. *Describe conditions in which the body temperature is excessively high or low.;*

Practical class 32

Histology of digestive system II

Microscopic Anatomy of the Glands associated with the Digestive Tract. Salivary Glands. Liver, pancreas

Max grade – 2

1. *Describe the microscopic anatomy of the glands associated with the digestive tract, salivary glands.*
2. *Describe of the features of blood supply to the liver;*
3. *Sources of development of the liver and pancreas.*
4. *Describe the microscopic anatomy of the liver, gallbladder, bile duct system, and pancreas;*
5. *Clarify the microscopic and ultramicroscopic structure of hepatocytes and their functional significance;*

Practical class 33

Male Reproductive Anatomy. Puberty, Hormonal Control, and Climacteric. Sperm and Semen. Male Sexual Response

Max grade – 2

1. *Define explain why sexual reproduction in humans requires two different types of gametes;*
2. *Enumerate the functions of the male and female reproductive systems;*
3. *Distinguish between the gonads of the two sexes, and between the internal and external genitalia.*
4. *Describe the anatomy of the male reproductive tract*

Practical class 34

Female Reproductive Anatomy. Puberty and Menopause.

Max grade – 2

1. *Describe the structure and function of the glands and other accessory organs of the female reproductive system;*
2. *Discuss female sexual development from puberty through menopause.*
3. *Menstruation Cycle*

Practical class 35

Oogenesis and the Sexual Cycle. Female Sexual Response. Pregnancy and Childbirth. Lactation.

Max grade – 2

1. *Female Sexual Response*
2. *Describe the oogenesis process*

3. *Itemize the major hormones of pregnancy and describe their effects;*
4. *Describe the effects of pregnancy on a woman's body;*
5. *Explain what happens in each stage of childbirth;*
6. *Discuss the hormonal control of lactation;*
7. *Discuss the composition of colostrum and breast milk*
8. *Demonstrate knowledge of normal anatomy and physiology (including histology) on the topic*

Practical class 36

Histology Reproductive System Male Reproductive System

Max grade – 1

1. *Identify the structural elements of the organs of the male reproductive system in histological specimens.*
2. *Explain the features of spermatogenesis, the endocrine function of the testes,*
3. *Determine the tissue composition and layers of the vas deferens and additional organs of the male reproductive system.*
4. *Describe the microscopic anatomy of portion of the male urinary system.*

CC-4 Max grade-15

Practical class 37

Histology Reproductive System I Female reproductive system: Ovaries, ovarian follicles, fallopian tubes.

Max grade – 2

1. *Identify the structural elements of the organs of the female reproductive system in histological preparations.*
2. *Explain the features of ovogenesis. To master the endocrine functions of the ovaries.*
3. *Explain determine the tissue composition and membrane of the oviduct;*
4. *Define the microscopic anatomy of portion of the female urinary system*
5. *Describe the anatomy of the ovaries;*
6. *Describe the gross anatomy of the female reproductive tract;*
7. *Relate the process of egg production to the cyclic changes in the ovary and uterus;*
8. *Describe the production of eggs and how it is correlated with cyclic changes in the ovaries and uterus;*
9. *Describe the physiological processes that occur in the female during sexual intercourse.*

Practical class 38

Histology Female reproductive system: Uterus. Menstrual Cycle

max grade-2

1. *Menstrual cycle.*
2. *Relate the process of egg production to the cyclic changes in the ovary and uterus;*
3. *Describe the production of eggs and how it is correlated with cyclic changes in the ovaries and uterus;*

Practical class 39

Histology Female reproductive system: Mammary Glands. Prepubertal Mammary Gland. Resting Adult Mammary Gland. Pregnant Adult Mammary Gland. Lactating Mammary Gland. Correlation the endometrial changes with events in the ovary and with changing pituitary and ovarian hormone levels.

Practical class 40

Human development- Embryology I

Human embryology

Sex cells. Early stages of development of the human embryo.

Max grade – 2

1. *Identify Sex cells. Early stages of development of the human embryo.*
2. *Define the microscopic anatomy of portion of the embryo.*

Practical class 41

Human development- Embryology II

Human embryology Fertilization. Splitting up. Cleavage. Implantation

Max grade – 2

Practical class 42

Human development- Embryology

Human embryology Gastrulation. Differentiation of germ layers, organogenesis.

Max grade – 2

1. *Describe a micrograph of the umbilical cord, fetal and maternal parts of the placenta.*
2. *Define and Identify embryos cells*

Practical class 43

Human embryology Extraembryonic organs – amnion, yolk sac, chorion, placenta, umbilical cord

Max grade – 2

CC-5 Max grade -15

Case study. Max grade-5

Methodical instruction for tutorials

Aim: apply knowledge of morphology (anatomy and histology) and physiology of organs and systems of the human body (respiratory, digestive, urinary, reproductive, endocrine, autonomic nervous system, sensory organs) in age and the sexual aspect of human organ systems for understanding vital processes and maintaining homeostasis;

Learning outcomes:

1. *demonstrate knowledge of anatomy, topography and visualization in the age and sexual aspects of human organ systems;*
2. *be able to identify cellular and non-cellular structures that make up the tissues of organ systems on microscopic specimens with an understanding of their formation and function;*
3. *demonstrate knowledge of the physiological processes that determine the activity and mechanisms of regulation of human organs and systems (digestion, functioning of the senses);*

4. *understand and apply knowledge of the neuro-endocrine regulation of homeostasis, metabolism in different situations;*
5. *understand the processes and anatomical and physiological processes during pregnancy, development and growth, involuntional changes, with various physiological stress variants;*
6. *demonstrate knowledge of the physiology of higher nervous activity and the cognitive process;*
7. *be able to conduct research on basic physiological functions;*
8. *demonstrate analytical skills in the integration of knowledge of the anatomy, histology and function of the human body to understand and evaluate normal life processes.*
9. *demonstrate the ability to identify learning gaps and create strategies to enhance one's own knowledge and skills.*
10. *communicate effectively with other students and teachers regarding medical and scientific information, articulate their opinions clearly when discussing the morphological structure and physiological processes, and work effectively as a member of the team.*

Work schedule:

1. Familiarize yourself with the basic and additional literature, use textbooks, the syllabus and present directions, Internet resources to prepare for seminars.
2. Be prepared for class and participate actively on case-discussion and problem solving group activities.
3. Use the examples (in this number cases and your own experience studied before) for illustration of theoretic material.
4. Use different tools for studying, discussion and visualisation of thoughts - drawing, mind maps, 3d-modelling.
5. Use the group work with cases for the development of teamwork skills, communication, problem solving and self-studying.

Rating for each topic:

| Week/ Lesson | Topic title | Number of hours lecture | Number of hours | Max grad e |
|------------------------|---|-------------------------------|-----------------------|------------------|
| 1-1 | Lecture 1 General Properties and anatomy of the Autonomic Nervous System Autonomic Effects on Target Organs. | 2 | | |
| 1-2 | Lecture 2 Central Control of Autonomic Function | 1 | | |
| 1-3 | Lecture 3 Properties and Types of Sensory Receptors The General Senses; | 2 | | |
| 1-4 | Practical lesson 1 General Properties and anatomy of the Autonomic Nervous System | | 2 | 2 |
| 1-5 | Practical lesson 2 Autonomic Effects on Target Organs. Central Control of Autonomic Function | | 2 | 2 |
| 1-6 | Practical lesson 3 Properties and Types of Sensory Receptor. The General Senses; | | 2 | 2 |
| IWS with teacher | Consultation on anatomical structures for models according to the topics covered. Analysis of written | | 4 | |

| | | | | |
|------------------|---|---|---|---|
| | answers and Current control questions - work on mistakes. | | | |
| 2-1 | Lecture 4 The Chemical Senses. Taste and Smell | 1 | | |
| 2-2 | Lecture 5 Eye and Vision. | 2 | | |
| 2-3 | Lecture 6 Histology The Sensory Organs. Organ of sight, organ of smell. Organs of hearing and balance, taste. | 1 | | |
| 2-4 | Lecture 7 The laws of geometric optics. Eye as an optical system | 1 | | |
| 2-5 | Practical lesson 4 The Chemical Senses. Taste and Smell. | | 2 | 2 |
| 2-6 | Practical lesson 5 Eye and Vision. | | 2 | 2 |
| 2-7 | Practical lesson 6 Histology The Sensory Organs Organ of sight, organ of smell. Organs of hearing and balance, taste. | | 2 | 2 |
| IWS with teacher | Independent work of the student with the teacher – presentation of Independent work of the student#2 | | 4 | |
| 3-1 | Lecture 8 Hearing and Equilibrium | 2 | | |
| 3-2 | Lecture 9 Histology The Sensory Organs Organ of sight, organ of smell. Organs of hearing and balance, taste | 1 | | |
| 3-3 | Lecture 10 Overview of the Endocrine system. The Hypothalamus and Pituitary Gland. Other Endocrine glands. | 2 | | |
| 3-4 | Practical lesson 7 The laws of geometric optics. Eye as an optical system | | 2 | 2 |
| 3-5 | Practical lesson 8. Hearing and Equilibrium | | 2 | 2 |
| 3-6 | Practical lesson 9 Histology The Sensory Organs Organ of sight, organ of smell. Organs of hearing and balance, taste. | | 2 | 2 |
| IWS with teacher | Independent work of the student with the teacher – presentation of Independent work of the student#2 | | 4 | |
| 4-1 | Lecture 11 Hormones and Their Actions. | 2 | | |
| 4-2 | Lecture 12 Endocrine Disorders | 2 | | |
| 4-3 | Lecture 13 Histology of Endocrine System I General features of the Endocrine system. Microscopic Anatomy of endocrine organs. Hypothalamus, pituitary, pineal gland. | 1 | | |

| | | | | |
|-----|--|---|---|----|
| 4-4 | Practical lesson 10 Overview of the Endocrine system. The Hypothalamus and Pituitary Gland | | 2 | 2 |
| 4-5 | Practical lesson 11 Other Endocrine glands. | | 2 | 2 |
| 4-6 | Practical lesson 12 Histology of Endocrine System I General features of the Endocrine system. Microscopic Anatomy of endocrine organs. Hypothalamus, pituitary, pineal gland. | | 2 | 2 |
| | CC-1 | | | 23 |
| 5-1 | Lecture 14 Stress and Adaptation Eicosanoids and Other Signaling Molecules | 1 | | |
| 5-2 | Lecture 15 The Respiratory System 1-2 Anatomy of the Respiratory System. Pulmonary Ventilation 2 | 2 | | |
| 5-3 | Lecture 16 Respiratory system: nasal cavity, trachea, bronchi, bronchioles, alveolar ducts. | 2 | | |
| 5-4 | Practical lesson 13 Hormones and Their Actions | | 2 | 2 |
| 5-5 | Practical lesson 14 Endocrine Disorders. | | 2 | 2 |
| 5-6 | Practical lesson 15 Histology of Endocrine System II Microscopic Anatomy of endocrine organs Adrenal gland, thyroid, parathyroid glands. | | 2 | 2 |
| | IWS | | | 5 |
| 6-1 | Lecture 17 The Respiratory System 3 Gas Exchange and Transport. | 2 | | |
| 6-2 | Lecture 18 The Respiratory System 4 Respiratory Disorders | 2 | | |
| 6-3 | Lecture 19 Histology of urinary system Histology of urinary system | 1 | | |
| 6-4 | Practical lesson 16 Stress and Adaptation Eicosanoids and Other Signaling Molecules | | 1 | 1 |
| 6-6 | Practical lesson 17 The Respiratory System 1-2 Anatomy of the Respiratory System. Pulmonary Ventilation | | 2 | 2 |
| 6-7 | Practical lesson 18 Human tissue 7-8 | | 2 | 2 |

| | | | | |
|-----|---|---|---|-----|
| | Respiratory system: nasal cavity, trachea, bronchi, bronchioles, alveolar ducts. | | | |
| | Current control -1 | | 1 | 10 |
| 7-1 | Lecture 20 The urinary System 1 Functions of the Urinary System. Anatomy of the Kidney. | 2 | | |
| 7-2 | Lecture 21 The urinary System 2 Urine Formation I: Glomerular Filtration | 2 | | |
| 7-3 | Lecture 22 Histology of the Lymphoid System. The major effector cells of the Lymphoid system, organs of the Lymphoid System, Thymus, Lymph Nodes, Tonsils, and Spleen | 1 | | |
| 7-4 | Practical lesson 19 The Respiratory System 3-4 Gas Exchange and Transport. Respiratory Disorders | | 2 | 2 |
| 7-5 | Current control -2 | | 2 | 24 |
| 7-6 | Practical lesson 20 The urinary System 1-2 Functions of the Urinary System. Anatomy of the Kidney. Urine Formation I: Glomerular Filtration | | 2 | 2 |
| | INTERIM EXAMINATION-1 | | | 100 |
| | IWST Consultation and feedback | | | |
| 8-1 | Lecture 23 The urinary System 3 Urine Formation II: Tubular Reabsorption and Secretion. | 2 | | |
| 8-2 | Lecture 24 The urinary System 4 Urine Formation III: Water Conservation | 2 | | |
| 8-3 | Lecture 25 The urinary System 5 Urine and Renal Function Tests | 1 | | |
| 8-4 | Practical lesson 21 The urinary System 3-4 Urine Formation II: Tubular Reabsorption and Secretion. Urine Formation III: Water Conservation | | 2 | 2 |
| 8-5 | Practical lesson 22 The urinary System 5 Urine and Renal Function Tests | | 2 | 2 |
| 8-6 | Practical lesson 23 Histology urinary system | | 2 | 2 |
| | IWST Consultation and feedback on difficult topics | | | |
| 9-1 | Lecture 26 The lymphatic and immune system. Fluid Balance | 2 | | |
| 9-2 | Lecture 27 Electrolyte Balance and Acid–Base Balance | 2 | | |

| | | | | |
|------|--|---|---|---|
| 9-3 | Lecture 28 Histology of Digestive System I. General features of the Digestive Tract. Histology of the esophagus, stomach, small intestine, large intestine. | 1 | | |
| 9-4 | Practical lesson 24 The lymphatic and immune system | | 2 | 2 |
| 9-5 | Practical lesson 25 Fluid Balance Electrolyte Balance and Acid–BaseBalance | | 2 | 2 |
| 9-6 | Practical lesson 26 Histology of the Lymphoid System. The major effector cells of the Lymphoid system, organs of the Lymphoid System, Thymus, Lymph Nodes, Tonsils, and Spleen | | 2 | 2 |
| | IWST Consultation and feedback on difficult topics | | | |
| 10-1 | Lecture 29 General Anatomy and Digestive Processes. The Mouth Through Esophagus. The Stomach. | 2 | | |
| 10-2 | Lecture 30 Liver. Gallbladder, pancreas. The Small Intestine and Large Intestine. Chemical Digestion and Absorption | 2 | | |
| 10-3 | Lecture 31 Histology of Digestive System I. General features of the Digestive Tract. Histology of the esophagus, stomach, small intestine, large intestine. | 1 | | |
| 10-4 | Practical lesson 27 General Anatomy and Digestive Processes. The Mouth Through Esophagus. The Stomach. | | 2 | 2 |
| 10-5 | Practical lesson 28 Liver. Gallbladder, pancreas. The Small Intestine and Large Intestine. Chemical Digestion and Absorption | | 2 | 2 |
| 10-6 | Practical lesson 29 Histology of Digestive System I. General features of the Digestive Tract. Histology of the esophagus, stomach, small intestine, large intestine. | | 2 | 2 |
| | | | | |
| | CASE STUDY | | | 5 |
| 11-1 | Lecture 32 Histology of digestive system II. Microscopic Anatomy of the Glands associated with the Digestive Tract. Salivary Glands. Liver, pancreas | 1 | | |
| 11-2 | Lecture 33 Nutrition. Carbohydrate Metabolism. Lipid and Protein Metabolism. | 2 | | |

| | | | | |
|-------------------|---|---|---|----|
| 11-3 | Lecture 34 Metabolic States and Metabolic Rate Body Heat and Thermoregulation | 2 | | |
| 11-4 | Practical lesson 30 Nutrition. Carbohydrate Metabolism. Lipid and Protein Metabolism. | | 2 | 2 |
| 11-5 | Practical lesson 31 Metabolic States and Metabolic Rate. Body Heat and Thermoregulation | | 2 | 2 |
| 11-6 | Practical lesson 32 Histology of digestive system II. Microscopic Anatomy of the Glands associated with the Digestive Tract. Salivary Glands. Liver, pancreas | | 2 | 2 |
| CC-3 | | | | 19 |
| 12-1 | Lecture 35 Histology Reproductive System Male Reproductive System | 1 | | |
| 12-2 | Lecture 36 Male Reproductive Anatomy. Puberty, Hormonal Control and Climacteric. | 2 | | |
| 12-3 | Lecture 37. Sperm and Semen. Male Sexual Response | 1 | | |
| 12-4 | Lecture 38. Female Reproductive Anatomy. Puberty and Menopause. | 1 | | |
| 12-5 | Practical lesson 33 Male Reproductive Anatomy. Puberty, Hormonal Control, and Climacteric. Sperm and Semen. Male Sexual Response | | 2 | 2 |
| 12-6 | Practical lesson 34 Female Reproductive Anatomy. Puberty and Menopause. | | 2 | 2 |
| 12-7 | Practical lesson 35 Histology Reproductive System Male Reproductive System | | 2 | 2 |
| | | | | |
| 13-1 | Lecture 39 Oogenesis and the Sexual Cycle. Female Sexual Response | 2 | | |
| 13-2 | Lecture 40 Pregnancy and Childbirth. Lactation | 1 | | |
| 13-3 | Lecture 41 Histology Reproductive System I Female reproductive system: Ovaries, ovarian follicles, fallopian tubes. | 2 | | |
| 13-4 | Practical lesson 36 Oogenesis and the Sexual Cycle. Female Sexual Response. Pregnancy and Childbirth. Lactation. | 2 | 2 | 2 |
| Current control-4 | | | 2 | 15 |

| | | | | |
|------|--|---|---|-----|
| 13-5 | Practical lesson 37 Histology Reproductive System I Female reproductive system: Ovaries, ovarian follicles, fallopian tubes. | | 2 | 2 |
| 14-1 | Lecture 42 Histology Female reproductive system: Uterus Menstrual Cycle. Mammary Glands. | 2 | | |
| 14-2 | Lecture 43 Embryology I Human embryology Sex cells. Early stages of development of the human embryo Fertilization | 2 | | |
| 14-3 | Lecture 44 Human embryology Early stages of development of the human embryo Implantation. Cleavage | 1 | | |
| 14-4 | Practical lesson 38 Histology Female reproductive system: Uterus. Menstrual Cycle | | 2 | 2 |
| 14-5 | Practical lesson 39 Histology Female reproductive system: Mammary Glands. Prepubertal Mammary Gland. Resting Adult Mammary Gland. Pregnant Adult Mammary Gland. .Lactating Mammary Gland. Correlation the endometrial changes with events in the ovary and with changing pituitary and ovarian hormone levels. | | 2 | 2 |
| 14-6 | Practical lesson 40 Human embryology Sex cells. Early stages of development of the human embryo | | 2 | 2 |
| | Consultation on anatomical structures for models according to the topics covered. Analysis of written answers - work on mistakes. | | 4 | |
| 15-1 | Lecture 45 Human embryology Gastrulation. Differentiation of germ layers. | 2 | | |
| 15-2 | Lecture 46 Human embryology, organogenesis. | 1 | | |
| 15-3 | Lecture 47 Human embryology. Extraembryonic organs amnion, yolk sac, chorion, placenta, umbilical cord | 2 | | |
| 15-4 | Practical lesson 41 Human embryology Fertilization. Cleavage. Implantation | | 2 | 2 |
| 15-5 | Practical lesson 42 Human embryology Gastrulation. Differentiation of germ layers, organogenesis. | | 2 | 2 |
| 15-6 | Practical lesson 43 Human embryology Extraembryonic organs – amnion, yolk sac, chorion, placenta, umbilical cord | | 1 | 1 |
| 15-7 | Current control-5 | | 1 | 15 |
| | Total | | | 200 |

SOME TIPS ON TEAMWORK AND LEARNING

The medical profession involves working in multidisciplinary teams, so these skills are identified as key in the competence of the doctor and other health professionals in all countries.

Therefore, group work is included as an essential component in the practical exercises of our course. In addition, it aims to provide a safe environment in which you can try out new ideas and practices and acquire relevant group skills. These can be tasks for performance in pairs, triples or small groups of 4-6 people (work with cases, tasks of the ISW, etc.).

When you are working on a project or task in a team, you have the opportunity to use the various strengths of the group members to create a wider and better project or task than if you were working independently.

Group training means you need to share your knowledge and ideas with other students. There are two benefits to this: you need to think carefully about your own ideas in order to explain them to others, and you expand your own understanding, taking into account the knowledge and ideas of others.

Interpersonal Communication and Discussion

Take some time to chat and get to know each of your group mates. The better you know each other and the more convenient you communicate, the more effective you can work together.

Create a culture of mutual respect in your group. You probably had little choice or no choice at all when forming training groups and small teams in the classroom. Therefore, you will have to learn to overcome the differences between people. In addition, you will not have the opportunity to choose employees in the workplace, and at work, you will experience much greater pressure to be a productive member of the team.

For effective communication and discussion in a team: you should not be shy to express your opinion and it is important to feel that these opinions will be heard; it is necessary to feel that all members of the group make a feasible contribution to solving problems, observing agreed rules and plans, performing work efficiently and on time; it is important to know that everyone's feelings are taken into account by team members, but the goals and objectives of the group are not compromised, in favor of the whims or desires of individual members;

Try to express your opinion and listen to others. There is nothing wrong with disagreeing with your classmates, no matter how confident they are. When you disagree, be constructive and focus on the problem, not the person. Similarly, when someone disagrees with you, respect what he says and the risk that he takes upon himself to express his opinion. Try to find a way that everyone can agree with, and this is not necessarily the opinion of the loudest or smartest member of the team.

Below we provide some examples of constructive and destructive group behavior

Constructive group behavior - a person who:

Unites - interest in the views and opinions of others and willingness to adapt to interest

Clarifies - clearly defines the problems for the group by listening, summarizing, focusing the discussion

Inspires - encourages the group, stimulates participation and progress

Harmonizes - stimulates group unity and teamwork. For example, uses humor as a relaxation after difficult situations.

Take the risk - willingness to take risks at the expense of oneself for the success of the group or project

Manages the process - organizes a group on the issues of the process: for example, plan, schedule, timeline, topic, solution methods, and use of information

Destructive group behavior:

Domination - takes a lot of time expressing your opinion and views. Trying to take control by capturing energy, time, etc.

Fussiness - hastens the group to move quickly before the task is completed. Impatient in listening to other opinions and working together.

Suspension - removes itself from a discussion or decision. Opt out

Ignoring - does not respect or belittle the ideas and suggestions of the team or individuals. An extreme manifestation of ignoring is an insult in the form of ridicule.

Distraction - excessive talkativeness, tells stories and leads groups away from the goal

Blocking - prevents group progress by denying all ideas and suggestions. "It will not work because ..."

Effective group work does not arise by itself. A conscious and planned effort is needed, and since many people participate in it, one cannot rely on memory; need to make notes. **The following steps** will help you and your team work together effectively.

1. Define clear objectives. At each stage, you should try to coordinate the tasks. They include a timeline for the project, as well as more specific tasks (such as "agree on an approach to the task before Friday"). Each meeting or discussion should also begin with a specific goal (for example, make a list of tasks that need to be completed). Tasks should be broken down into smaller parts and planned. Sometimes one part cannot be started until the other part is finished, so you may need to draw a simple temporary map.

- discuss the resources that you have and those that you will need to find.
- formulate the desired result.
- consider how you know when you did it well enough?
- split tasks between the team and
- set deadlines for subtasks and time for future meetings.

2. Set the basic rules. Discussions can become erratic and can prevent more modest group members from participating if you do not have rules to stimulate discussion, resolve disagreements, and make decisions without repetition. Set the rules from the start and change them as needed. For example: an interesting rule that was developed by one group - anyone who missed a meeting would buy the rest of the group coffee in a coffee shop. No one ever missed a meeting after that.

3. Communicate effectively. Make sure you regularly communicate with group members. Try to be clear and positive in what you say without repeating.

4. Find consensus. People work together most effectively when they work towards a goal with which they have agreed. Make sure everyone has their own opinion, even if you need time to get more participants to say something. Make sure you listen to everyone's ideas and then try to come to an agreement that everyone shares and everyone has contributed.

5. Define the roles. Divide the work that needs to be done into separate tasks, for which you can use the strengths of individual team members. Define roles for both fulfilling your tasks and for meetings / discussions (for example, Arani is responsible for summarizing the discussions, Joseph is for everyone to express their opinions and make decisions, etc.).

Examples of roles and functions:

Facilitator or leader (depending on context) - to clarify the goals of the meeting and to summarize the discussions and decisions; ensures that the meeting takes place, continues and the basic rules are respected.

Secretary - keep a record of the ideas discussed and decisions made and who does what.

Time Manager - to make sure that you discuss everything that you need in the time allotted for the meeting.

Controller - to ensure that work is completed by an agreed time, and to solve problems if they are not being performed.

A process observer is someone who monitors the process, not the content, and can bring problems to the attention of the team. In this role, it is important to be positive, not condemning.

Editor - bring all materials together, identify gaps or matches and ensure consistency in the final presentation.

6. Make it clear. When a decision is made, it should be explained in such a way that it is absolutely clear to everyone that it was decided, including the time frame.

7. Keep good notes. Always summarize the discussions and document the decisions and publish them (for example in WhatsApp chat) so you can always get back to them. This includes lists of those who agreed what to do.

8. Stick to the plan. If you agreed to do something as part of the plan, do it. Your group relies on you to do what you agreed to do, and exactly in this way, not in the way you would like. If you think the plan should be reviewed, discuss it.

9. Keep track of progress and keep up to date. Discuss progress together regarding your schedule and deadlines. Make sure you meet deadlines personally so you do not let your group down.

Co-writing a document / report

Joint writing is one of the most difficult parts of group work. There are many ways to do this, and your group must decide how to separate the work of writing, comparing, editing, and finalizing your work. Writing in a group (six people crowd around the keyboard) is a recipe for conflict and lack of progress. The other extreme - when one person assumes all responsibility and ultimately does most of the work - is also unproductive and contributes to conflict.

Three approaches are possible when working on a common document:

1 - One person writes the most part - this means that a narrow circle of ideas is used, and the rest of the team does not learn (and will not learn) to write reports and documents.

2 - Each person writes one section - then it is difficult to make a single consistent report, and you will not know about the rest, except for your own section.

3- Co-writing. This is the most productive way to solve group problems and provides the greatest benefit from collaboration. For example: in each section, there is a writer and at least one reviewer, and each team member is the author of a section and a reviewer of another one.

All team members before finalization by **the editor** must review the final product. Alternatively, you can have one author with others, editors, add and review, and someone tidies the finished report.

Try to divide the writing of source documents into tasks and solve them individually or in pairs. After the first draft of the sections are written, send out all the components and read them. You will probably need to come together to discuss how to combine them so that they fit together. Any participants who were not involved in preparing the drafts can do part of this work. Then edit, improve and polish the draft. It's convenient to collaborate on documents in Google documents.

When preparing a report / final document, regularly check the following:

- Is the purpose of the project clear from the report?
- Are the conclusions or recommendations clear?
- Do conclusions follow from the main part of the report?
- Do sections fit well?
- Does the report achieve goals (and evaluation criteria)?

- Are the necessary components sufficiently covered?

Whatever method you use, all group members must agree on the process and how they are going to maximize the collaborative approach to writing the final document.

Monitoring team performance and coping

Below is a checklist that includes a list of common problems that arise in a group work. Use it regularly to identify problems before they get out of hand. If serious problems and tensions arise, use it to determine where something might go wrong. First answer each question about yourself, and then give answer to this **question** about the group as a whole. Then gather a group and discuss where, in your opinion, problems may arise, and think about how you can overcome these problems.

Each participant must complete this checklist. You should do this exercise regularly to track and improve your team’s performance.

1. Answer each question regarding your teamwork.
2. Answer each question regarding the rest of the team.
3. Get together with your entire team and discuss where, in your opinion, any problems arise.
4. Discuss what you are going to do to overcome these problems.

Checklist for self-assessment of team effectiveness.

| You | I personally | Group as a whole | Comments |
|--|--------------|------------------|----------|
| Effectively clarify your tasks and tasks at each stage? | | | |
| Evaluate the progress of work? | | | |
| We clarify and document everything that the group decided? | | | |
| We clarify who will do what and how? | | | |
| We clarify by what date each task should be done? | | | |
| Setting meeting management rules? | | | |
| Adhere to agreed rules? | | | |
| Listening to each other? | | | |
| Allow some team members to dominate? | | | |
| Allow some team members to refuse / withdraw? | | | |
| We sacrifice personal desires for the success of the team? | | | |

| | | | |
|--|--|--|--|
| Recognize the feelings of other team members? | | | |
| Making equal contributions to team progress? | | | |
| Adhere to agreed rules for writing and naming files? | | | |

Points and Grade

Group tasks and assignments mean that grades are given to the whole group based on the results of the work of the whole group. Everyone should be interested in ensuring the effective contribution of all members of the group and ensuring the high quality of the assignment. Sometimes, to assess the relative contribution of each to the group process, a form of peer-to-peer or peer review and a team assessment form will be used. This can be used to moderate assignment grades, or simply as a way to give feedback on your work in a group. The following are examples of student assessment criteria for team training.

| № | Student assessment criteria in practical classes |
|----------|--|
| 1 | <p><i>Preparation for classes:</i></p> <p>He studies information focused on the case and problematic issues, uses various sources, and supports the statements with relevant links.</p> |
| 2 | <p><i>Group skills and professional attitude:</i></p> <p>Demonstrates excellent attendance, reliability, responsibility Takes the initiative, takes an active part in the discussion, helps the teammates, willingly takes on tasks</p> |
| 3 | <p><i>Communication skills:</i></p> <p>Actively listens, shows emotions according to the situation, is susceptible to non-verbal and emotional signals, shows respect and correctness in relation to others, helps to resolve misunderstandings and conflicts</p> |
| 4 | <p><i>Feedback Skills:</i></p> <p>Demonstrates a high level of introspection, critically evaluates oneself and colleagues, provides constructive and objective feedback in a friendly manner, accepts feedback without opposition</p> |
| 5 | <p><i>Skills of critical thinking and effective learning:</i></p> <p>Effectively participates in generating hypotheses and formulating problematic questions, gives relevant examples from life, skillfully applies knowledge to the problem / case under consideration, critically evaluates information, draws conclusions, explains and substantiates statements, draws diagrams and drawings, demonstrates a constant interest in the material being studied</p> |

6 *Theoretical knowledge and skills on the topic of the lesson:*

All key aspects are presented logically; accuracy, relevance of answers to the questions posed without redundancy; integration of theoretical issues; Use of relevant examples proper use of professional terminology

Basic literature:

1. Saladin, Kenneth S: Anatomy & Physiology. The Unity of Form and Function (2016, McGraw-Hill Education) на англ. яз.
2. Costanzo, Linda S.: BRS Physiology. Board Review Series. 7 edition. -Wolters Kluwer Health, 2018.- 307p. - ISBN 1496367693, 9781496367693
3. Leslie P. Gartner: Color Atlas and Text of Histology. - 7th Edition. - Wolters Kluwer, 2017. ISBN 1496346734, 9781496346735
4. Russell K. Hobbie, Bradley J. Roth: Intermediate Physics for Medicine and Biology. - Springer, 2015. - ISBN 3319126822, 9783319126821
5. Andersson D, Medical Terminology: The Best and Most Effective Way to Memorize, Pronounce and Understand Medical Terms: Second Edition, ISBN-13 : 978-1519066626, 2016
6. Shoibekova, Alima Zhorabaevna. Latin and Fundamentals of Medical Terminology for Medical Students with Training English [Text] : educational man. / A. Zh. Shoibekova, 2016. - 163, [1] p.
7. Sembulingam, K. Essentials of Medical Physiology [Text] : [monogr.] / K. Sembulingam, P. Sembulingam ; Madha Medical College [et al.]. - 7th ed. - New Delhi ; London ; Philadelphia : Jaypee, 2016. - 1112 p. : il. - Ind.: p. 1069-1112. - ISBN 978-93-85999-11-6

Additional literature:

8. Standring, Susan: Gray's Anatomy: The Anatomical Basis of Clinical Practice. - 41 Elsevier Limited, 2016
9. Elaine N. Marieb, Lori A. Smith: Human Anatomy & Physiology Laboratory Manual, Main Version. - 11 edition. - Pearson Education, 2015. - ISBN 9780133999143
10. Scanlon V. C, Essentials of Anatomy and Physiology 8th Edition, F.A. Davis Company, 2018
11. Victor P. Eroschenko, Atlas of Histology with Functional Correlations 13th Edition, LWW, 2017
12. William Bialek: Biophysics: Searching for Principles. -Princeton University Press, 2012. - ISBN 0691138915, 9780691138916
13. Ghosh, Byas Deb. Human Anatomy [Text] : For Students / B. D. Ghosh ; [Anatomical Society of India (West Bengal Chapter) et al.]. - 2nd ed. - New Delhi ; Panama City ; London : Jaypee, 2013. - 948 p. : il. - Ind.: p. 913-948. - ISBN 978-93-5025-942-9
14. Mazumdar, Sibani. Anatomy at a Glance [Text] : An Exam-Oriented Text / S. Mazumdar ; Calcutta National Medical College [et al.]. - 2nd ed. - New Delhi ; London ; Philadelphia : Jaypee, 2014. - 534 p. : il. - Ind.: p. 525-534. - ISBN 978-93-5152-355-0 : App.: p. 519-520. Glossary: p. 521-524.
15. Baktybayeva, Lyaila Kyrgyzbayevna. Base of Physiology [Text] : laboratory practicum / L. K. Baktybayeva, G. T. Zhamanbayeva, M. S. Kulbayeva ; Al-Farabi

Kazakh National University. - Almaty : Qazaq University, 2017. - 146 p. : il. - Bibliogr.: p. 145. - ISBN 978-601-04-3138-6

Online resources:

1. <https://app.lecturio.com/#/>
2. <https://3d4medical.com/>
3. https://www.youtube.com/channel/UCc_I2c2bUtO0p4DVeo6-Kxg
4. <https://sites.google.com/a/umich.edu/bluelink/curricula/anatomy-403?authuser=0>
5. <https://histologyknu.wixsite.com/info/gistologicheskie-sajty>
6. <http://www.histology-world.com/contents/contents.htm>
7. <http://www.histologyguide.com/slidebox/02-epithelium.html>
8. <https://histology.medicine.umich.edu/resources>
9. <https://web.duke.edu/histology/>
10. <http://virtuallslides.med.umich.edu/Histology/view.apml?listview=1&>