MINISTRY OF EDUCATION AND SCIENCE OF THE KYRGYZ REPUBLIC
TRAINING AND PRODUCTION COMPLEX
"INTERNATIONAL UNIVERSITY OF KYRGYZSTAN"

SILLABUS

On the discipline "Normal physiology"

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   - ✓ physiological and environmental problems of human adaptation at high altitude, hormonal profile of mountain residents

2. **Pre-requisites.** The successful study of normal physiology relies on the following disciplines:

- Maths (higher algebra, mathematical analysis, mathematical statistics);
- Physics (electromagnetic radiation, Coulomb interaction, diffraction);
- Inorganic chemistry (structure and properties of atoms, periodic law, molecular structure, theory of chemical bonding, stereochemistry);
- Physical chemistry (the nature of the chemical bond in molecules and crystals, chemical thermodynamics, phase diagrams);
- Organic chemistry (classification and nomenclature of compounds, molecular structure, isomerism);
- Biochemistry (biochemistry of organs and tissues, biochemical basis of processes occurring in the human body);
- Introduction to biology (biological organization of living organisms);
- Biology (structure and function of proteins and nucleic acids, genes and genomes, self-organization of living systems, fundamentals of biotechnology);
- Anatomy and histology of human body. Environmental factors.

Post-requisites. Knowledge of normal physiology is necessary to study other theoretical and clinical disciplines: pathological physiology, pharmacology, microbiology, pediatrics, neurology, internal medicine. Knowledge about the normal functioning of the human body underlies the diagnosis and correction of diseases studied in clinical disciplines, pre-clinical interpretation and analysis of human body's functioning.

3. THE PURPOSE AND OBJECTIVES OF THE COURSE

Physiology is the science of the normal functional activity of an organism, its individual organs and systems. It studies the physiological patterns and changes in the functional activity of the human body in various environmental conditions. As an academic discipline, physiology is the methodological foundation of clinical disciplines. It's study allows you to successfully master the subjects, such as biochemistry, pharmacology, therapy, surgery, etc., which are necessary for the preparation of a highly qualified doctor.

3.1. At the end of the MBBS physiology course the student must:

- Have and understanding of the functioning of the different organ systems of the human body and their interactions toward maintenance of homeostasis or a constant internal environment
- Be able to apply the knowledge of physical process to comprehend mechanism of disease and basis of treatment.
- Be able to perform some basic laboratory tests and know their results
- Be able to perform clinical examination to assess various organ systems

Goal of discipline:

to form systemic basis of physiological mechanisms of development on the different organization levels; to develop analytical thinking; teach to generalize scientific knowledge; impart professional skills to fundamental and application study in medicine.

The objectives of the discipline are:

- development of students' skills in analyzing the functions of the whole organism from the position of integral physiology, analytical methodology and the foundations of clinical medicine;
- formation of a systematic approach among students in understanding the physiological mechanisms underlying the interaction with environmental factors and the implementation of adaptive strategies of the human body in the implementation of healthy functions of the human body from the standpoint of the concept of functional systems;
- study by students of the methods and principles of research assessing the state of the regulatory and homeostatic systems of the body in the experiment, taking into account their applicability in clinical practice;

4. The name and complexity of the discipline

Discipline	Year	Semester	Weeks	Number of hours for lecture classes	Number of hours for practice classes	Number of hours for independent work	Total hours
Normal physiology		2	18	36	54	90	180

5. The content of the discipline

THEMATIC PLAN OF PRACTICE (2nd semester)

№	Topic	Questions	Homework	Topics for independent work	Teaching hours
1.	Systemic and pulmonary circulations. Properties of cardiac muscles	1. Functional anatomy of the heart, heart valves. 2. Cardiac muscle (contractile and excitatory conductive fibers) 3. Properties of cardiac muscle 4. Action potential of contractile cardiac muscle fibers 5. Conduction system of the heart 6. Action potential in the sinus node	1. Heart structure (diagram) 2. Action potential of contractile and excitatory cardiac muscle fibers (compare) 3. Conduction system of the heart (diagram and explanation)	1. Anomalies of heart development 2. Age-related changes in the contractile function of the heart 3. The influence of physical activity (fitness) on the development and functioning of the heart 4. Electrocardiostimulation 5. The influence of physical exercises on the cardiovascular system. 6. The influence of mental activity and emotions on the cardiovascular system and pathologies. 7. The influence of environmental factors (temperature, noise, etc.) and manufacture factors on the cardiovascular system. 8. Comparative characteristics of the excitability of skeletal muscle and cardiac muscle.	2
2.	Electrical activity of the heart. Basics of electrocardiography. ECG interpretation.	1. Electrocardiography (ECG) as a method for recording the biopotentials of the heart. Biophysical basics of ECG. 2. ECG interpretation. 3. Normal human ECG, its genesis, clinical significance. 4. Heart abnormalities on the ECG (excitability, rhythmicity, conductivity, contractility) 5. The registration technique and the method of electrocardiogram analysis.	1. Properties of cardiac muscle (excitability, rhythmicity, conductivity, contractility), their abnormalities 2. Characteristics of the normal ECG (diagram).		2
3.	Cardiac cycle. Auscultation.	1. Cardiac cycle, its phases. 2. Blood pressure in the cavities of the heart in different phases of the cardiac cycle, role of the heart valves. Functional diagnostics of the heart.	1. Cardiac cycle, its phases (diagram and explanation). 2. Phonocardiography. Heart sounds and their origin		2

		Electrocardiography, phonocardiography, auscultation. 3. Heart sounds, their origin and characteristics. Phonocardiography, its clinical significance. Murmurs.		9. Comparative characteristics of the properties of contractile and excitatory cardiac muscle fibers. 10. Modern ideas about the mechanisms of cardiac muscle autorhythmicity. 11. The conduction system of the heart, its role in coordinating the activity of the heart chambers. 12. Features of myocardial contractility 13. Basic laws of cardiohemodynamics. 14. Modern methods of research of heart activity. 15. ECG as one of the informative methods for studying the properties of the heart. 16. Auscultation of tones and phonocardiogram as a method of heart examination 17. Features of the interaction of the intrinsic and extrinsic regulation systems of the heart 18. The role of the intrinsic conduction system in the regulation of the heart. 19. The role of the autonomic system in the regulation of the myocardium.	
4.	Regulation of cardiac activity	1. Intrinsic regulation of of the heart activity. Franc-Starling Law. 2. Intercellular regulation. All or None Law. Intrinsic nervous regulation. Cholinergic and adrenergic mechanisms. 3. Extrinsic regulation. Innervation of the heart. Autonomic control of the heart. 4. Humoral regulation. The influence of hormones, electrolytes, metabolites on the work of the heart. 5. Interaction of nervous and humoral mechanisms.	1. Cardiac output 2. Regulation of heart rate 3. Regulation of stroke volume		2
5.	Functional classification of vessels. Venous return of blood to the heart. Lymphatic system	1. Morphological and functional classification of blood vessels. 2. Blood pressure in systemic and pulmonary circulation. Blood pressure and factors affecting its value. The systolic, diastolic, pulse and mean arterial pressure. Blood pressure registration methods. 3. Arterial pulse, its origin, pulse characteristics, registration. Sphygmography, the speed of propagation of the pulse wave. 4. Peripheral vascular resistance and factors affecting its value. 5. Exchange of substances	1. Measure of the blood pressure at rest and physical exercises 2. Pulse examining 3. Modeling of blood flow (using of rubber tubes) 4. Calculation of peripheral vascular resistance 5. Calculation of Cardiac output 6. Calculation of mean arterial (mean blood) pressure		2

		6. Lymphatic system. Lymph, formation, rate of flow, composition, functions. 7. Venous return.		21. Humoral regulation of the heart.	
6.	Regulation of blood flow and blood pressure.	1. Control of blood flow. 2. Control of blood pressure.	6. Modeling of sympathetic and parasympathetic reflexes 7. Preparing the table "Hormonal effect on the heart and vascular reactions"		2
7.	UNIT 4	1st Module			2
8.	Mechanism of respiration. Spirometry	1. The functional organizing of the Respiratory tract. Respiratory unit. 2. Lungs, respiratory and non-respiratory functions. Pleura. 3. The mechanism of pulmonary ventilation. Muscles of respiration. Biomechanics of inhalation and exhalation. 4. Lung compliance and elastic recoil. Ventilation (pulmonary and alveolar). Dead space air. 5. Chronic obstructive diseases	1. Conducting and respiratory zones of RT (diagram and explanation). 2. Biomechanics of inhalation and exhalation. 3. Pulmonary functional tests: lung volumes and capacities (diagram and explanation). 4. Spirometry	1. The importance of breathing for the body. 2. Role of the pleural cavity in the biomechanics of respiration. 3. Biomechanics of inhalation and exhalation. 4. Surfactant and its significance in the breathing. 5. Features of pulmonary ventilation at rest and during physical activity.	2
9.	Partial pressure of gases. Transport of gases.	1. Respiratory membrane, it's organization 2. Factors affecting gaseous exchange. 3. Composition of atmospheric, alveolar and exhaled air. 4. Transport of O_2. Factors of oxyhemoglobin formation. Bohr effect. 5. Transport of CO_2. Chloride shift mechanism. Haldane effect.	1. Exchange of gases in the lungs and tissues (diagram). 2. Calculation of PO_2 and PCO_2 in atmospheric and alveolar air 3. Demonstration and interpretation of dissociation curve of HbO_2 (diagram and explanation).	6. Gas exchange in the lungs and its determinants. 7. Features of pulmonary ventilation in childhood. 8. Alveolar air, its physiological role and ventilation conditions. 9. Aviation, high altitude, and space physiology	2

			4. Oxygen saturation of blood, pulse oximeter. 5. Transport of CO_2. Chloride shift mechanism.	10. Effects of low oxygen pressure on the body 11. Saturation of hemoglobin with oxygen at different altitudes. 12. Acclimatization to low PO_2 13. Natural acclimatization of native human beings living at high altitudes 14. Physiology of deep-sea diving and other hyperbaric conditions 15. Effect of high partial pressures of individual gases on the body 16. Effects of Aging on the respiratory system	
10.	Control of Respiration.	1. Components of respiratory control: respiratory centers, receptors and effectors. 2. Nervous control of rhythmic respiration by respiratory center. 3. Chemical regulation of respiration. Central and peripherial chemoreceptors. 4. Reflex control of respiration. Hering Breuer reflex.	1. Regulation of respiration during exercises, at low atmospheric pressure (altitude disease), at high atmospheric pressure; artificial respiration; pathological types of breathing 2. Hypoxia and hypercapnia, its types. 3. Respiratory acidosis and alkalosis.		2
11.	UNIT 5				2
12.	The main principles of digestion.	1. Role of Digestion 2. Basic principles of the gastrointestinal tract. 3. Basic Digestive processes 4. Functional structure of GIT/ the accessory glands. 5. Control of gastrointestinal function (neural, hormonal and reflexes). Enteric nervous system.	1. Functional anatomy of GIT 2. Gastrointestinal motility and its regulation. 3. Diagram of secretion, incretion and excretion 4. Table of DS	1. The mechanisms of absorption of various substances in the gastrointestinal tract. 2. General principles and mechanisms of digestion regulation. 3. Digestive and non-digestive functions of the oral cavity.	2

13.	Mechanical and chemical digestion and absorption.	1. Phases of digestion. 2. Digestion in the oral cavity and stomach. 3. Regulation of salivation. Composition of saliva. 4. Methods for examining the oral cavity 5. Movement of the oral cavity: chewing, swallowing, 6. Structure of the stomach, digestion and non-digestion functions. 7. Composition, enzymes and properties of gastric juice, its secretion and regulation. 8. Digestion in the stomach. Gastric glands. 9. Tonic and propulsive contractions in the stomach. Stomach emptying.	1. Diagram of digestion in the stomach, graphs of the participation of the liver and pancreas in digestion. 2. Fill in the table. 3. Modeling of the conditional and innate reflexes of salivation 4. Diagrams of regulation of secretion of gastric juice, bile and pancreatic juice in different phases of digestion.	4. Modern experimental methods for studying the activity of the digestive system 5. Regulation of stomach secretion 6. Formation and secretion of bile, its regulation 7. Digestion in the duodenum 8. The main enzymes of intestinal juice 9. Theory of hunger. 10. The microflora of the large intestine 11. The defecation, its regulation	2
14.		1. Features of digestion in the duodenum. 2. Exocrine functions of pancreas. Composition and enzymes of pancreatic juice, its regulation. 3. Liver functions. Bile, formation and secretion, composition, role and properties. Gallbladder. Regulation of bile secretion. 4. Cavity and parietal digestion. 5. Mixing and propulsive-peristaltic movement in the small intestine, their regulation. Ileocecal valve. 6. Digestion in the large intestine, its features. Juice composition, functions,	10. Compose table of digestive juices (enzymatic components). 11. Digestion pattern in the small and large intestine 12. Digestion and absorption of proteins, carbohydrates and lipids, water and electrolytes. 13. Describe the types of contraction of the small and large intestine. 14. Gastrointestinal disorders.		2

		regulation of secretion and motor activity. Mechanisms of absorption. 7. Digestion and absorption of proteins, carbohydrates and lipids, water and electrolytes. 8. Haustrations and mass movements of the colon. Defecation. 9. Physiological bases of hunger and satiety			
15.	Physiology of Nutrition.	1. Metabolism. Balanced diet. 2. Physiologic basis of nutrition. Conception of adequate and rational nutrition. 3. Basal metabolic rate. 4. Evaluating methods of energy inputs.	5. Calculation of daily nutritional ration 6. Calculation of BMR by the Harris - Benedict's test 7. Detection of body surface by the nomograms		2
16.	Unit 6	2nd Module 16.11.2020-21.11.2020			2
17.	Principles of body temperature regulation.	1. Physiology of thermoreceptors. Thermoregulatory centers. 2. Mechanisms of heat production. 3. Mechanisms of heat transfer. 4. Thermoregulation mechanisms 5. Muscle work and thermoregulation. Hedging. 6. Peripheral and central termoregulation mechanisms.	1. Thermoreceptors 2. Heat production and heat transfer 3. Thermometry		2
18.	Physiology of excretion. GFR	1. Excretory organs, their role in maintaining homeostasis. 2. General organization of kidneys and urinary tract. Functional features of kidneys. Functional anatomy of nephron, its types.	1. Functional structure of the kidneys and nephron (diagram and explanation) 2. Filtration, reabsorption and secretion	1. Mechanisms of hormonal regulation of ion and water transport 2. Osmo and volume-regulating functions of the kidney	2

		3. Urine formation (phases). Characteristics of filtration membrane. 4. Glomerular filtration, its regulation. Factors affecting glomerular filtration rate. Measurement of GFR. 5. Glomerular deseases.	3. Difference in composition of ultrafiltration and urine. 4. Clearance methods	3. Endocrine function of the kidneys 4. The Renin angiotensin system 5. Regulation of acid-base balance by the kidney 6. Features of the of urination in newborns	
19.	Tubular reabsorption and secretion.	6. Characteristics of reabsorption in various sections of the tubules: proximal convoluted tubule, loop of Henle, distal convoluted tubule and collecting duct. 7. Mechanisms of tubular transport: active and passive transport of substances. 8. Reabsorption of substances, ions and water. 9. Secretory processes in the different segments of renal tubules. Juxtaglomerular apparatus.	1. Tubular reabsorption and secretion, their regulation. 2. Active and passive transport of substances 3. Diagram of action of the hormones aldosterone and ADH on the nephron		2
20.	Regulation of tubular reabsorption and secretion	4. Nervous, hormonal and autoregulation of tubular reabsorption and secretion. Renin-angiotensin system. 5. Urine, its composition. Transport of urine. Micturition reflex. Inhibition in the brain cortex (types and mechanisms). 6. The role of the kidneys in the regulation of physiological characteristics of the body	1. Urine, its composition. Micturition reflex. 2. Microscopic, biochemical and clinical urine analysis 3. Kidney diseases.		2
21.	Acid-base balance	1. Concept of Acid & base. 2. pH and H^+ ion concentration. Handerson-Hasselbalch equation.	1. Control of pH 2. Respiratory acidosis and alkalosis	8. Acid-base balance of blood. Respiratory and metabolic alkalosis and acidosis.	

		3. Mechanisms to maintain acid base balance: buffer systems, respiratory and renal mechanisms. 4. Respiratory regulation of acid-base balance 5. Renal control of acid-base balance 6. Secretion of H^+ and Reabsorption of HCO_3^- by the Renal Tubules 7. Respiratory and metabolic acidosis and alkalosis	3. Metabolic acidosis and alkalosis	9. Buffer systems of blood. 10. Respiratory control of acid base balance	
22.	Unit 7	3rd Module			2
23.	Physiology of conditional reflexes	1. Higher central nervous system activity 2. Functional structure of the cerebral cortex. Methods for studying the functions of the cortex. EEG forms and their diagnostic value. 3. Physiological basis, stages of development of conditional reflexes. 4. Inhibition of conditional reflexes.	1. Formation of reflexes: mechanisms of conditional and innate reflexes. 2. Demonstration of reflexes (light reflex, olfactory reflex, papillary reflex, salivation – smell reflex) 3. Unconditional (external) and conditional (internal) inhibition, their main differences. 4. Examples of external and internal inhibition.		2
24.	Physiology of higher mental activity.	1. Integrative activity of the cerebral cortex. The role of functional asymmetry of the hemispheres in the formation of individual-typological characteristics of a person. 2. The concept of GNI. The concept of manifestations of GNI (congenital and acquired behaviors, higher mental	5. Functional structure of the cerebral cortex. Hemispheric lateralization. 6. Research mental functions (questionnaire tests for evaluation of extraversion, introversion, emotional stabillity)		2

		functions). Types of human GNI with their characteristics. Determining of GNI. Braking in GNI, its types. 3. Motivation, their classification. An idea of the mechanisms of motivation, the role of the hypothalamus and the cerebral cortex in this process.			
25.	Memory.	1. The modern concept of memory. Types and mechanisms of memory. 2. Chemical or molecular basis, consolidation, classification, drugs facilitating memory. 3. Emotions, the biological role of emotions, their value in the formation of motivational behavior. Structural organization of emotions (G. Shepherd) 4. Classification of emotions. The concept of the mechanisms of emotion. The role of various brain structures, mediator systems in the formation of emotional states.			2
26.	Sleep and wakefulness.	1. Sleep, kinds and phases. The role of different parts of the brain in the mechanisms of sleep and waking. 2. Physiological changes during sleep, types of sleep, stages of sleep and eeg pattern, mechanism of sleep. 3. Principles of rational organization of mental activity.	Human adaptations. Lab. w. Work efficiency (test)		2
27.	UNIT 8				2
	Total				**54**

6. **List of main and additional literature**

6.1 **Main literature:**

1. Medical Physiology/ Pr. A.C. Guyton and Pr. J.E. Hall/ - Philadelphia – New York, 2000
2. Fundamentals of Human physiology/ L Sherwood/ 4th edition, 2012
3. Medical physiology/ JD Kibble, CR Halsey – 2009
4. Principles of Human physiology/ CL Stanfield – 5th edition, 2013
5. Review of Medical Physiology/ William F.Ganong/ McGraw-Hill – 20th edition, 2001
6. Human Physiology/ R.F. Schmidt and G. Thews/ - London – Paris – Tokyo – Hong Kong, 1996.
7. Human physiology/ SI Fox – 12th edition, 2009

Additional literature:

1. Brass LF/ Thrombin and platelet activation. Chest 124 (3 Suppl). – 18S, - 2003
2. Caprini JA, Glase CJ, Anderson CB, Hathaway K/ Laboratory markers in the diagnosis of venous thromboembolism. Circulation 109 (12 Suppl 1) – 14, - 2004
3. Hemotopoietic stem cells/ Trigg ME// Pediatrics 113 (4 Suppl). – 1051, - 2004
4. Allman BL, Rice CL: Neuromuscular fatigue and aging: central and peripheral factors. Muscle Nerve 25:785, 2002
5. Amonof MJ: Electromyography in clinical practice. New York: Churchill Livingstone, 1998
6. Rekling JC, Func GD, Bayliss DA, e al: Synaptic control of motoneuronal excitability. Physiol. Rev. 80:767, 2000
7. Tang W, Sencer S, Hamilton SL: Calmodulin modulation of proteins involved in excitation-contraction coupling. Frnt Biosci 7:583, 2002
8. Morris AJ, Malbon CC/ Physiological regulation of g protein-linked signaling// Physiol. Rev. 79:1373, 1999
9. Albright TD, Jessell TM, Kandell ER, Posner MI: Progress in the neural sciences in the century after Cajal (and the mysteries that remain). Ann NY Acad Sci 929:11, 2001
10. Burmester T, Hankeln T: Neuroglobin: a respiratory protein of the nervous system. News Physiol. Sci 19:110, 2004
11. Chesler M: Regulation and modulation of pH in the brain. Physiol. Rev. 83:1183, 2003
12. Kenney WL, Munce TA: Aging and human temperature regulation. J. Appl. Physiol. 95:2598, 2003
13. Fuchs F, Smith SH: Calcium, cross-bridges, and the Frank-Starling relationship. News Physiol. Sci 16:5, 2001
14. Fossard Ha: Calcium sodium and calcium channels: a history of excitatory currents. Cardiovasc. Res. 55:1, 2002
15. Daniels CB, Orgeig S: Pulmonary surfactant: the key to evolution of air breathing. News Physiol. Sci 18:151, 2003
16. Sant'Ambrogio G, Widdicombe J: Reflexes from airway rapidly adapting receptors. Respir. Physiol. 125:33, 2001

17. Johnson LR: Gastrointestinal Physiology, 6th ed. St.Louis: Mosby, 2001
18. Bouret SG, Simerly RB: Leptin and development of hypothalamic feeding circuits. Endocrinology 145:2621, 2004

7. **Monitoring and evaluation of learning outcomes.** Each module is evaluated by a 100 point system. The maximum score is 100. A student is allowed to pass the final control if he has a total score in the discipline for the exam of 40 or more points, to offset 60 or more points. Attendance - 20 points. For each unworked pass, 2 points are deducted.

Type of control (current, milestone, final)	Control form	Assessment of learning outcomes
Current control	Oral survey, written work.	20 points
IWS+IWW	Performing assignments, work with literature	20 points
Milestone control (module submission)	Testing, control tasks	40 points
Final control (differential test)	Conversation, examination tickets	100 points

8. **Discipline Policy (Corporate Culture Code, Student Code of Ethics):**

• Mandatory class attendance.
• Active student participation in practical classes, preliminary preparation and homework.
• High-quality and timely execution of tasks on the IWS and IWW.
• Participation in all types of control (current, mid-term, final).

Additional requirements:

а/ one delay in classes and / or leaving before they are completed for any reason are considered as one missed lesson that cannot be restored;

б/ unacceptable: the use of cell phones during class, cheating and plagiarism, untimely delivery of tasks, non-observance of subordination and rules of conduct.

Help: For advice on the implementation of independent work (IWS / IWW), their submission and protection, as well as for additional information on the material covered and all other questions that arise on the course being taught, contact the teacher during the hours allotted for the IWW.

STUDENT INDIVIDUAL WORK

Student individual work (hereinafter - SIW) - Work on a specific list of those designated for independent study provided by instructional literature and recommendations, which is evaluated by means of tests, examinations, colloquiums, essays, essays and reports; the entire volume of SIW is supported by assignments that require the students' daily independent study.

Structure. The content of the SIW program.

1. Tasks for SIW should include the specific issues that are not considered in the classroom lessons and not given for independent study of the students.
2. Tasks for the SIW may include the description of each module or may be submitted as a separate section of the program.
3. Tasks for SIW are mandatory for the discipline.
4. Tasks for the SIW include:
   - The list of issues;
   - The time allotted for self-training;
   - The terms of issue of assignments and the time of their delivery to a teacher (for weeks);
   - List of references required for the assignments;
   - criteria for evaluation.
5. Check of the assignments for SIW is carried out by a teacher either during the seminars or interim monitoring, or (in the case of a written assignments) in extracurricular time.
6. The content of the SIW program:
   - the topic title;
   - the aim of the lesson;
   - tasks and questions;
   - methodical recommendations for doing the tasks;
   - references.

Tasks for independent work:

Student must choose and prepare a presentation on one of the following topics:

1. Acid-base balance of blood. Respiratory and metabolic alkalosis and acidosis.
2. Buffer systems of blood.
3. Coagulation system of blood.
4. Sympathetic nervous system (schematic explanation)
5. Parasympathetic nervous system (schematic explanation)
6. Daily nutritional ratio for persons of mental professions
7. Lymph and lymphatic system (lymphokinesis)

8. The composition, quantity and functions of the lymph
9. Lymphopoiesis. The factors promoting lymph circulation
10. Hyperbaria and Hypoxia
11. Influence of sea level on the functions of different systems
12. Urine formation in different normal clinical cases
13. Features of digestion in GIT (table presentation)
14. Physiological basis of professional activity
15. Physiological basis of healthy life-style