

**THE HIGHER STATE EDUCATIONAL INSTITUTION
« THE UKRAINIAN MEDICAL STOMATOLOGIC ACADEMY »
DEPARTMENT OF MEDICAL BIOLOGY**

**THE INFORMATION REFERENCE BOOK
OF | MEDICAL BIOLOGY
FOR THE 1st YEAR STUDENTS
MEDICAL DEPARTMENT**

Speciality: 7.110101 " Medical affair ”

7.110104" Pediatrics ”

Poltava - 2008

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The information reference book is made by Staff of Department of Medical Biology of the Higher State Educational Institution of Ukraine “Ukrainian Medical Stomatologic Academy” on the basis of the curriculum of discipline “Medical biology” (2005 year).

The information reference book will help the students of 1-st year of Medical faculty to adapt the studying of a subject matter in conditions introduction of credit - modular system of study and also regularly prepare to the lectures, practical classes, to perform out-of-class work, occupy the practical skills, to know the basic and additional scientific - methodical literature in a subject.

For students preparation for successful pass of final credit - modular class in this reference book we are diving the examples of control tasks, lists of control questions from the all modules.

Reviewer

Dean of Medical Department, Doctor of Medical Sciences, *professor Krjuchko Tatyana Aleksandrovna*

The Assistant of The Dean of Medical Department, the Head of the Cyclic Methodical Commission from the Credit - Modular system studying, Candidate of Medical Sciences, the Senior lecturer

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Explanatory note

The curriculum from of isciplines " *Medical biology* " for students of the Higher Medical Educational institutions III-I V levels of accreditation it is made for specialities " Medical affair " 7.110104, "Pediatrics" of 7.110104 directions of preparation 1101 "Medicine" according to the educational -professional program (*EPP*), and also the Educational-qualifying characteristic (*EQC*) preparations of experts.

It agrees the curriculum of preparation of doctors for Educational -qualifying level "Expert" of studying of a subject matter " *Medical biology* " it is carried out by students on I year, in I and II semester.

Quantity of credits - 5,5; from them: in I semester - 2,5; II semester - 3,0.

Medical biology as a subject matter:

- a) It is based on previous studied subjects in school of such subjects as " General biology ", "Human biology", " Biology of animals " "Plant biology";
- b) Provides the higher biological level;
- c) Laying the base for the subsequent mastering of knowledge from profile theoretical and clinical professional – practical disciplines (medical chemistry, medical genetics, clinical immunology, infectious diseases, internal medicine, surgery, pediatrics ect.).

The organization of educational process is carried out by credit - module-rate system according to the requirements of Bolon declarations.

The program of discipline “ Medical biology ” is structured on three modules, which contains eight structural modules.

The module 1. Biological features of Human being

Substantial modules:

Molecular-cellular level of the organization of a life

The module 2. Organismic level of the organization of a life. Bases of Human Genetics

Substantial modules:

Laws of a heredity and variability

Methods of studying of a heredity of the person. Hereditary illnesses.

Biology of individual development.

The module 3. Population-specific, biogeocentical and biospheric level of life organizations

Substantial modules:

Medical and biologic bases of Parasitism. Medical protozoology

Medical helminthology

Medical arachnoentomology

Interrelation individual and historical development. Biosphere and the person

Kinds of educational classes according to the curriculum are: a) lectures; b) practical classes; c) independent work of students; d) consultations.

Themes of a lecture raise open problem questions of corresponding sections of medical biology.

Such means of diagnostics of a level of preparation of students are applied: tests, situational tasks, identification on macro- and micropreparations of activators and carriers of parasitic illnesses, the control of practical skills.

The final control of mastering of modules is carried out on their end on final control classes. The mark for medical biology is rating and it is exposed on a multimark scale in view of estimations of mastering of separate modules.

The information on structure of discipline and its estimation

Structure of discipline	Rating scale	The minimal score (for the admission to the
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			modular control)
	Weight of a theme in points	Traditional estimation	
The module I 30 hours. (6\18\6) 1,0 credit topics - 8	15 point 10 point 5 point 0 point	"5 " 4 " " 3 " " 2 "	40 point
The module II 60 hours. (14\26\20) 2,0 credit Substantial modules - 3 topics - 12	9 point 6 point 3 point 0 point	"5 " 4 " " 3 " " 2 "	36 point
The module III 75 hours (10\36\29) 2,5 credits of Substantial modules - 4 topics - 17	7 points 5 points 3 points 0 points	"5 " 4 " " 3 " " 2 "	51 point

Estimation of disciplines: **score** (M1, M2, M3)
 (average arithmetic the sums =-----
 points from all modules) **3** (quantity of modules)

THE PURPOSE OF STUDYING OF THE SUBJECT MATTER

The final aim of a subject matter " *Medical biology* " comes up from the purposes educational-professional programs of preparation of graduates of the Higher Medical Educational institution also are defined by the contents of that system knowledge and skills of which the expert of the doctor should take hold. Knowledge, what students receive from a subject matter " *Medical biology* ", is base for the block of disciplines which provide natural-science (*block NS*) and professional – practical (*the block of PP*) preparation.

Final purposes of a subject matter are formulated according to educational-professional programs and the educational-qualifying characteristic (EQC):

- To define biological essence and mechanisms of development of illnesses, which result of anthropogenous changes in an environment.
- To define displays of action of biological laws in course of ontogenesis of person.
- To explain laws of displays of ability to live of a human body on molecular-biological and cellular levels.
- To explain essence and mechanisms of display in phenotype the hereditary illnesses of the person.
- To make previous conclusion relating presence of parasitic invasion of the person and to define actions of preventive maintenance of diseases.

The module 1. Biological features of human being.

The substantial module 1. *Molecular-cellular level of the organization of life*

Specific purposes:

- . To treat the concept of life essence in modern level and to define the place of the person in system of wildlife.
- . To classify biological systems and life level organization.
- . To interpret value of processes which occur on molecular-genetic and cellular level of the organization of a life for understanding pathogenesis of hereditary, somatic, oncological, infectious and other illnesses of the person.
- . To acquire morphophysiological properties of a cell and to treat value of infringement of main principles of its functioning in occurrence of pathological processes at the person.
- . To treat modern objective and subjective methods of studying human karyotype and principles of classification of chromosomes.
- . To acquire molecular mechanisms of realization of the genetic information in a cell and also its regulation in eukaryots|.

To analyze changes in cells and their structures during life cycle and value of infringement of mitosis.

To explain mechanisms of a course of meiosis I and II, their biological value.

To treat value of a modern method of culture of cells for biology and medicine.

Structure of control credits module 1.

“Biological features of human vital activity.

Molecular-cellular level of living organization.”

Lecture plan

1.	Introduction to the Medical Biology course. Structural-functional cell organization.	2
2.	Molecular basis of inheritance. Realization of hereditary information.	2
3.	Reproduction on cellular level.	2
	Total	6

Plan of practical classes

N	Topic	Hours
1	Levels of living matter organization. Optic systems in biological investigation and their usage. micropreparations.	2
2	Morphology of a cell. Structural components of cytoplasm and a nucleus.	2
3	Cellular membranes. Transport of substances through plasmalemma.	2

4	Morphology of chromosomes. Human karyotype.	2
5	Molecular bases of a heredity. Characteristic nucleic acids.	2
6	Structure of genes pro- and eukatyotes.	2
7	Organization of information flows in the cell. Regulation of genes expression. Molecular mechanisms of the human variability.	2
8	Life cycle of a cell. Cell fission .	2
9	The control of mastering of the module 1. ”Biological features of human vital activity.”	2
	Total	18

Thematic plan of self-preparation work for the 1st year students

№	Topic	Hours
1.	Preparation for the practical classes - theoretical preparation and working off the practical skills.	5
2.	Working off the topics which are not included into the classes plans.	
	The organization of flows of substance and energy in a cell.	1
	Life of cells outside of an organism. Cloning of cells.	1
3.	Preparation for the final control of mastering of the module 1.	3
	In total	10

Division of Points Given to students

№.	The module 1	Quantity of points
1.	<i>The substantial module 1</i>	120

	Theme 1	15
	Theme 2	15
	Theme 3	15
	Theme 4	15
	Theme 5	15
	Theme 6	15
	Theme 7	15
	Theme 8	15
	Total	120
	Theme 9	80
	In total 	200

The note: Marked points are appropriated to the student at mastering of theme, in case of absence of mastering concerns "0" points.

Topic 1. Introduction to the Medical Biology course. Levels of living matter organization. Optic systems in biological investigation and their usage.

Medical biology as a science about bases of the human vital activity which studies laws of a heredity, individual and evolutionary development and social adaptations of the person to conditions of an environment in connection with its biosocial essence.

The present stage of development of the general and medical biology. A place of biology in system of medical education.

Essence of a life. Forms of a life, its fundamental properties and attributes. Evolutional structural levels of the organization of a life; elementary structures of levels and the basic biological phenomena which characterize them. Values of representations about levels of the organization alive for medicine.

Place of the person in system of the organic world. Parities of the physical and chemical, biological and social phenomena in ability to live of the person.

Optical systems in biological researches. A structure of a light microscope and a rule of work with it. Technics of manufacturing of thin micropreparations.

Topic 2. Morphology of a cell. Structural components of cytoplasm and a nucleus.

The structurally functional organization of the eukaryotes cells.

Chemical compound of a cell: micro- and macromolecules. Water, values of hydrogen bonds during ability to live of a cell. Organic substances.

Cytoplasm and cytoskeleton.

Organelles of cytoplasm, principles of functioning. Inclusions in cells, their functions.

Nucleus – the central informational apparatus of cell. Chromatin, its kinds.

Methods of studying of structure and functioning of a cell.

Topic 3. Cellular membranes. Transport of substances through plasmalemma.

Cell as open system. Assimilation and dissimilation.

Cellular membranes, their structure and functions.

Receptors of cells. Transport of substances through plasmalemma.

The organization of flow of substance and energy in a cell. Stages of a power exchange, ATP. Distribution of energy.

Topic 4. Morphology of chromosomes. Human karyotype.

Nucleus - the central information of cell division. Structure of interphase nucleus.

Chromosomal and genomal levels of the organization of a hereditary material.

Chromatin.

Karyotype: characteristic and classification of chromosomes of the person. Rules of chromosomes. The chromosomal analysis. Nucleolus, a role in formation of ribosomes.

Idiogramme.

Topic 5. Molecular bases of a heredity. Characteristic nucleic acids.

Molecular bases of a heredity. The characteristic nucleic acids: DNA and RNA, their organization, specific specificity, a role in saving and transfer of the hereditary

information. Replication. Maintenance of genetic stability of cells: self-correction and reparation DNA.

Topic 6. Structure of genes pro- and eukaryotes. Genes structural, regulative, mRNA, rRNA.

Gene as unit of genetic function. A structure of a gene about and eukaryotes. Genes structural, regulative, mRNA, rRNA. A genetic code, its properties.

Topic 7. Organization of information flows in the cell. Regulation of genes expression. Molecular mechanisms of the human variability.

The organization of the flows information in a cell. Transcription. Processing, splicing. Translation. Posttransmitting modification of proteins. Exon-introns organization genome of eukaryotes. Molecular mechanisms of variability at the person.

Topic 8. Life cycle of a cell. Cell fission .

The time organization of a cell. A cellular cycle. Ways of cell fission: amitotic division, mitosis. Endomitosis, polyteny. Changes of cells and their structures during the mitosis, cell cycle time. Growth of cells. Factors of growth. Mitotic activity of tissue. Somatic mutations. Meiosis. Biological role of meiosis. Life of cells outside of an organism. Cloning of cells.

The control of mastering of the module 1.

”Biological features of human vital activity.”

Approximate variant for the final module control.

Test 1 level.

1. In a cell the virus of a flu has got. Where there is a biosynthesis of virus protein in a cell?
 - A. On membranes agranular endoplasmic reticulum |.
 - B. In a nucleus.
 - C. In lisosomes.
 - D. On polyribosomes.

E. Complex Golgy.

2. In one of cells organelles cells there is an end of a structure of protein molecule and complexis of protein molecules to carbohydrates, fats. Name this organelle

- A. ER
- B. Complex Golgi
- C. Lisosomes
- D. Ribosomes
- E. Mitochondria

3. In pancreatic gland cells digestive enzymes form in their inactive form (proenzyme). Which of cell organelles provide proenzymes forming?

- A. Ribosomes, mitochondria.
- B. Golgi complex.
- C. Gyaloplasma polysomes.
- D. Granular (rough) endoplasmic reticulum polysomes.
- E. Diktyosomes.
- F. Secondary lysosomes.
- G. Peroxysomes.
- H. Endoplasmic reticulum.
- I. Nucleus.

4. After tooth extraction in 40-aged man the wound surface formed. There is active reparation process in it. Which of the organelles provide this process most of all?

- A. Primary lysosomes.
- B. Golgi complex end endoplasmic reticulum.
- C. Cell center and centrioles.
- D. Nucleic chromosomes.
- E. Ribosomes.
- F. Peroxisomes.
- G. Phagosomes.

5. The cells were affected by the drugs that caused mitochondria destruction. What cytoplasmic organelles won't be formed, what processes will be destructed?

- A. Mitochondria.
- B. Golgi complex and endoplasmic reticulum.
- C. Cell center and cleavage spindle forming.
- D. Cell energy currency.
- E. Protein biosynthesis process: translation, transcription.

6. Lysosomes determine:

- A. Protein processing.
- B. Substances secretion.
- C. Intracellular digestion.
- D. Cyclosis.
- E. Substances degeneration products storage.

7. Substances are excreted from the cell through Golgi complex by means of connection with external membrane. How is this process named?

- A. Osmos.
- B. Active transport.
- C. Endocytosis.
- D. Phagocytosis.
- E. Exocytosis.
- F. Secretion.

8. Choose the structures and substances that compose ribosomes:

- A. DNA+protein.
- B. R-RNA+proteins.
- C. Small subunit+big subunit.
- D. Small subunit+big subunit+i-RNA.
- E. Nucleosides+ phosphoric acid residues.

9. Choose the structures and substances that compose ribosomes:

- A. DNA+protein.
- B. R-RNA+proteins.
- C. Small subunit+big subunit.
- D. Small subunit+big subunit+i-RNA.
- E. Nucleosides+ phosphoric acid residues

10. On what level of package the bacteria cell chromosomes are situated?
- A. Nucleosomic.
 - B. Microfibrillaris.
 - C. Molecular.
 - D. Chromonemic.
 - E. Chromatid-chromosome
11. What chromatin types possess a high transcriptional activity in cell nucleus?
- A. Euchromatin.
 - B. Heterochromatin.
 - C. Structural chromatin.
 - D. Optional (facultative) chromatin.
 - E. Barr bodies (X-chromatin).
 - F. Interphase chromonemas.
12. On what cell cycle stage human chromosomes and human karyotype is studied?
- A. In S-period.
 - B. In G₁-period.
 - C. During mitosis.
 - D. G₀-period.
 - E. During interphase.
 - F. Prophase.
 - G. Anaphase.
 - H. Metaphase.
13. On what mitosis stage human chromosomes and human karyotype is studied?
- A. Interphase.
 - B. Prophase.
 - C. Telophase.
 - D. Anaphase.
 - E. Metaphase.
14. Human karyotype in normal conditions is characterized:
- A. Diploid chromosome set (44A +2G).
 - B. Diploid chromosome set (46A+XX).

- C. Specific chromosome set as for its number and form.
 - D. Chromosomes forms and sizes typical for humans.
 - E. Constant chromosome number that is repeated from generation to generation.
15. From which of the groups the sex chromosomes (gonosomes) in human karyotype are separated?
- A. From the group A.
 - B. From the group C.
 - C. From the group D.
 - D. From the group G.
 - E. From the group F.
 - F. From the group E.
16. Call eukaryotic cell chromosome organization levels that are not typical for prokaryotic chromosome:
- A. Molecular.
 - B. Nucleosomic.
 - C. Fibrillaris.
 - D. Of chromonemas.
17. Chromatid-chromosome karyotype ideogram (karyogram) compiling was proposed by:
- A. Denver.
 - B. Navashyn.
 - C. Levytsky.
 - D. Patau.
 - E. Kasperson.
 - F. Tyo and Levan.
18. Who is famous for the creation of the space DNA structure model?
- A. K.Funk, 1912.
 - B. J.Watson, 1953.
 - C. N.I.Lunin, 1880.
 - D. E.Chargaff, 1950.
 - E. F.Krick, 1953.

19. Who is famous for the space DNA structure deciphering?
- A. E. Fisher, 1902.
 - B. K. Funk, 1912.
 - C. J. Watson, 1953.
 - D. N. I. Lunin, 1880.
 - E. E. Chargaff, 1950.
 - F. Krick, 1953
20. In what cell organelles the nucleic acids were determined at first?
- A. Lysosomes.
 - B. Mitochondria.
 - C. Vacuoles.
 - D. Endoplasmic reticulum.
 - E. Cytoplasm.
 - F. Nucleus.
 - G. Nucleolus.

Test on II level (3 points)

1. Which of mentioned life organization levels are the fundamental ones?
- A. Ontogenetic.
 - B. Subcellular.
 - C. Cellular.
 - D. Molecular-genetic.
 - E. Population-species.
2. Call elementary particle and elementary phenomena of molecular-genetic level:
- A. Molecular-genetic.
 - B. Ontogenetic.
 - C. Cellular.
 - D. Population-species.
 - F. Subcellular.
 - G. Transcription.
 - H. Replication.
 - I. Reparation.

J. Translation.

K. Gene mutation.

3. Major cell theory statements are the following:

- A. Cell is a structural-functional and genetical life unit.
- B. Cell arises as a result of cell-precursor (mother cell) division.
- C. Different organism's cells are similar in their structure, functions and chemical content.
- D. The metabolism typical of organisms takes place on the cellular level.
- E. All alive biosystem are characterized by cell structure.
- F. Gene cell system defines individual development of organism and phenotype forming.
- G. Different organisms cells are homological in their structure, functions and chemical content.
- H. Cell is multicellular organisms structural-functional unit.

4. Eukaryotic cell differs from prokaryotic one of:

- A. Cell wall structure.
- B. Cell membrane existence.
- C. Membrane organoids existence.
- D. Form of hereditary material (chromosomes) organizing.
- E. Photomembranes and mesosomes existence.
- F. High intensivity of metabolism process.
- G. Better development of microtubule system that determine movement.
- H. Major division way is a mitosis.
- I. Protein biosynthesis occurs on ribosomes.

5. Eukaryotic cell has:

- A. Plasmalemma.
- B. Cortex cytoplasmic level.
- C. Nucleus.
- D. Glycokalix.
- E. Cell wall.
- F. Mesosomes.

- G. Peroxisomes.
- H. Thilakoids.
- I. Microfilaments.

6. Nucleoli are:

- A. Constant cytoplasmic structures.
- B. Structures forming nucleolus chromosomes organizers.
- C. Chromosome regions responsible for r-RNA forming and processing.
- D. Secondary chromosomes constrictions.
- E. Heterochromatin chromosomes regions.
- F. Nucleus structure including filamentous and granular components.
- G. Primary chromosomes constrictions.

7. Indicate the substances which are the components of one r-RNA nucleotide:

- A. Ribose, phosphoric acid residue, nitrogenic base.
- B. Ribose, phosphoric acid residue, inosine.
- C. Ribose, phosphoric acid residue, pseudouracil.
- D. Adenine, guanine, cytosine, uracil.
- E. Adenine, guanine, cytosine, thymine.

8. The replication process is characterized by:

- A. Semiconservative mechanism.
- B. Participation of only DNA-polymerase in the process.
- C. Enzyme RNA-primaze participation.
- D. The splicing process is provided by DNA – ligase.
- E. Chelicase determines the complementary synthesis on 1 chain.
- F. T-RNA provides the nucleotides transport.
- G. Topoisomerase provides the DNA molecule undamaging.
- H. The reparation enzymes act.

9. What enzymes participate in the replication process?

- A. RNA – primaze.
- B. DNA – polymeraze.
- C. RNA – polymerase.
- D. DNA – ligase.

- E. Helicase.
 - F. Aminoacyl-m-RNA-synthetase.
 - G. Topoisomerase.
 - H. The reparation enzymes.
10. The replication process occurs:
- A. During mitotic interphase.
 - B. In eukaryotic cell hyaloplasma.
 - C. In nucleus karyoplasma.
 - D. In mitochondria and chloroplastes matrix.
 - E. In S-period of interphase.
 - F. During mitosis.
 - G. During the nucleus reparation.

Task from molecular biology. (6 points)

1. How many nucleotides are there in the gene (both DNA chain) that contains the information about insulin (protein) consisting of 51 amino acids?

Control theoretical questions. (on 10 points)

1. Chemical composition and feature of chromosome morphology. Dynamics of their structure in cell cycle.
2. Genetic code, its feature.

Practical skill – 4 points. (maximum)

Maximum amount – 80.

Minimum – 50.

Approximate list of control questions.

Module 1.

“Biological features of human vital activity.

Molecular-cellular level of living organization.”

1. Definition of biology as a science. The place and tasks of biology in training of doctors.

2. Definition of concept a life on modern level developments of a biological science. Forms and the basic properties alive.
3. The structural levels of living matter organization, their value for medicine.
4. Cell is an elementary structural, functional life unit. Pro- and eukaryotic cells.
5. Cell theory. Modern cell theory statements and value for medicine.
6. Cell morphophysiology. Cytoplasm and organelles.
7. Cellular membranes. A chemical compound. The spatial organization and value.
8. Nucleus in the interphase . Chromatin: levels the organizations of hereditary material (heterochromatin and euchromatin).
9. Chromosomal and genetical levels of the hereditary material organization during the mitotic divisions.
10. Chemical compound, feature of chromosomes morphology. Dynamics of their structure in a cellular cycle (interphase and metaphase chromosomes).
11. Human karyotype. Morphofunctional characteristic and classification of human chromosomes. Value of studying karyotype in medicine.
12. Molecular level of the hereditary information organization. Nucleic acids, their value.
13. Structure of a gene. Genes structural, regulatoral, synthesis t-RNA and r-RNA.
14. Replication DNA, its value. Self-correction and reparation DNA.
15. Genetic code, its properties.
16. Basic stages of protein biosynthesis.
17. Translation: initiation, elongation, termination. Posttranslational modifying of proteins - a basis of their functioning.
18. Features of realization of the eukaryotic genetic information. Exon-intron organization of eukaryotic genome, processing, splicing.
19. Features of the genes work regulation (pro- and eukayotic) .
20. Genetic engineering and biotechnology.
21. Time organization of a cell. A cellular cycle, its possible directions and division into periods.
22. Cell division. Concept of mitotic activity. Disorder of mitosis.
23. Meiosis. Mechanisms which define a genetic variety of gametes.

24. Cells life outside of an organism. Cloning of cells. Value of a method of tissue culture for medicine.

Module 2. Organismic level of living organization.

Bases of human genetics.

Substantial module 2. Laws of a heredity and variability.

Specific aimss:

To formulate value of Medical genetics.

To define type of inheritance Mendel attributes of the person.

To illustrate inheritance of groups of blood of the person behind antigenic system ABO as display plural allelism.

To differentiate kinds of interaction non-allele genes, display of attributes at diverse types of inheritance.

To apply knowledge of the chromosomal theory of a heredity to definition of display at offsprings as autosomal and the X-linked diseases.

To interpret the mechanism of genetic definition of sex as Mendel attributes of the person.

To explain value of processes which occur on organismic level of a life for understanding of mechanisms of occurrence of born defect of developments, and also somatic, infectious and other illnesses of the person.

To classify forms of variability as fundamental property of an alive matter.

To explain value of mutations and mutagen factors of different nature in occurrence of chromosomal and monogenic illnesses of the person.

To correlate influence of mutagen, cancerogenic and teratogenes substances to a condition of health of the certain contingent of persons.

Structure of module 2. Organismic level of living organization.

Bases of human genetics.

Lecture plan

Module 2. Organismic level of living organization. Basis of human genetics.		
Substantial module 2. Principle of heredity and variability.		
	Organismic level of genetic information organization. Gene interactions.	2
	Chromosomal heredity theory. Sex genetics.	2
	Human variation as a life characteristic and genetic phenomenon.	2
Substantial module 3. Method of studying heredity of human. Hereditary diseases.		
7.	Human genetics. Method of studying heredity of human.	2
8-9	Hereditary diseases. Medical-genetic consulting.	4
Substantial module 4. Biological individual development of an organism.		
	Molecular-genetic mechanism of ontogenesis. Disorders of ontogenesis, places in human pathology.	2
	In total	14

Plan of practical classes

10.	Biological characteristic of human reproduction. Gametogenesis. Fertilisation.	2
11.	Organismic level of the organization of the genetic information. Displays of the basic laws of inheritance on an example of human of Mendel's attributes. (mono-, di -and polyhybrid crossing.	2
12.	Allele and non-allele genes interaction. The phenomenon of pleyothropy. Plural alleles. Genetics of groups of blood.	2
13.	Linked inheritance. Sex genetics.	2
14.	Human variability as property of a life and the genetic phenomenon: phenotypic and genotypic variability.	2

**Substantial module 3. Methods of human heredity studying.
Hereditary diseases.**

15.	Bases of medical genetics. Methods of human heredity studying.	2
16.	Chromosomal diseases. Cytological method of their diagnostics.	2
17.	Molecular diseases. Biochemical method and DNA-diagnostics.	2
18.	Population-statistical method. Medical-genetic consulting.	2
19.	Practical skills of substantial modules 2 and 3. “Laws of a heredity”, “ Methods of human heredity studying. Hereditary diseases.”	2

Substantial module 4. Biology of individual development.

20.	Molecular-genetic mechanisms of ontogenesis. Characteristic of the human prenatal period. Ontogenesis disorder and their place in a human pathology.	2
21.	Postnatal period of ontogenesis. Biological mechanisms of organism homeostasis maintenance.	2
22.	Control of mastering of the module 2 “ Organismic a level of living organization. Bases of the human genetics.”	2
	In total	26

Thematic plan of self-preparation work

№	Theme	Quantity of hours
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Substantial module 2. Laws of a heredity and variability

Preparation for practical class - theoretical preparation and working off of practical skills	3
Working off the topics which not included into the plan of class	
Genetic maps. Methods of mapping chromosomes of the person. A	1

modern condition of research genome the person.	
Genetic danger of pollution of environment.	1
In total	5
The substantial module 3. Methods of studying of a heredity of the person. Hereditary illnesses	
Preparation for practical class - theoretical preparation and working off of practical skills	5
Working off the topics which not included into the plan of class	
Genic engineering. Biotechnology. Concept about genic therapy.	1
Methods of genetics of the person: dermatoglyphic, immunological, hybridizations of somatic cells.	1
Preparation for delivery of practical skills of substantial modules 2 and 3	3
In total	10
The substantial module 4. Biology of individual development	
Preparation for practical class - theoretical preparation and working off of practical skills	3
Working off the topics which not included into the plan of class.	
Old age as the closing stage ontogenesis of person. Theories of ageing	1
Concepts about a biofield, biological rhythms and their medical value	1
Preparation for the control of mastering of the module 2	3
In total	8
In total	21

Division of points Given to the students

No	The module 2	Quantity of points
1.	<i>The Substantial module 2</i>	36
	Theme 10	9

	Theme 11	9
	Theme 12	9
	Theme 13	9
2.	<i>The Substantial module 3</i>	45
	Theme 14	9
	Theme 15	9
	Theme 16	9
	Theme 17	9
	Theme 18	9
3.	<i>The Substantial module 4</i>	27
	Theme 19	9
	Theme 20	9
	Theme 21	9
	<i>Total substantial modules</i>	108
	<i>Preparation of the review the scientific literature, solving the tasks (individual work)</i>	12
	Theme 22	80
	Total	200

Topic 10. Biological characteristic of human reproduction. Gametogenesis.

Fertilisation.

Duplication as the mechanism of maintenance of a genetic continuity in a number of generations. Gametogenesis. Meiosis, its biological value. Fertilisation at the person - restoration diploid set of chromosomes, increase in a variety of genes. Features of a reproduction of the person in connection with its biosocial essence.

Topic 11. Organismic level of the organization of the genetic information. Displays of the basic laws of inheritance on an example of human of Mendel's attributes. (mono-, di -and polyhybrid crossing)

Genetics: a subject and a problem, stages of development; the basic terms and concepts of genetics.

Monohybrid crossing: the law of monotony of hybrids of the first generation, the law of splitting. The law of "cleanliness of gametes". Cytologic bases of laws.

Analyzing crossing, its practical application.

Lethal genes. Deviations from expected splitting.

Di- and polyhybrid crossing: the law of an independent combination of attributes, its cytologic bases. Dominant and recessive types of inheritance of normal and pathological attributes of the person. Intermediate character of inheritance at the person.

Topic 12. Allele and non-allele genes interaction. The phenomenon of pleiothropy.

Plural alleles. Genetics of groups of blood.

Interaction allele genes (full domination, incomplete domination, superdomination, codominantion) and non-allele genes. Polygenic inheritance of attributes at the person.

Primary and secondary pleiothropy. Series plural of alleles. Inheritance of groups of blood of the person on antigenic systems AB0 and MN. A Rhesus factor. The Rhesus factor - conflict.

Immunogenetic: a subject, problems. Tissue and specific specificity of protein, their antigenic properties.

Topic 13. Linked inheritance. Sex genetics.

The linked inheritance. Features of inheritance of groups of coupling.

The chromosomal theory of a heredity. The mechanism crossing over, cytologic proofs, biological value.

Genetic maps of chromosomes. Methods of mapping chromosomes of the person. A modern condition of researches genome the person.

Non-chromosomal heredity. Inheritance of a sex of the person. Inheritance of the diseases of the person linked to a sex. The attributes limited to a sex and dependent on a sex. The attributes linked to a sex, laws of their inheritance. Mechanisms of genetic definition of a sex at the person and their infringements. Bisexual human nature. A problem of redefinition of a sex, psychosocial aspects.

Topic 14. Human variability as property of a life and the genetic phenomenon: phenotypic and genotypic variability.

Variability, its forms and display on organismic levels.

Updatings and norm of reaction. Long updatings. Statistical regularities of modification variability.

Combinative variability. Mutational variability at the person and its displays.

Classification of mutations: chromosomal aberrations, genic.

Natural mutagenesis, induced mutagenesis. Mutagenes: physical, chemical, biological.

Genetic monitoring. Genetic danger of pollution of environment.

Substantial module 3. Methods of human heredity studying. Hereditary diseases.

Specific aims:

- To carry out the genealogic analysis of family trees of family with hereditary illnesses.
- To define the share of heredities and an environment in display of pathological attributes of the person with the help of twins method.
- To classify chromosomal illnesses of the person depending on type and kinds of mutations, in result of they have arisen.
- To analyse the karyotype of patient and to establish the diagnosis of chromosomal illness (karyotyping, definition X-and Y-sexual chromatine).
- To interpret achievement of genic and cellular therapy of hereditary illnesses;
- To explain value of a problem of a genetic cargo at the person.
- To apply knowledge of essence the law of genetic balance of genes and genotypes in populations for definition of their genetic structure.

Topic 15. Bases of medical genetics. Methods of human heredity studying.

Bases of medical genetics. The person as specific object of the genetic analysis. Methods of studying of heredity of the person. Genealogic method. Rules of construction of family trees. The genetic analysis of family trees.

Twins method.

Topic 16. Chromosomal diseases. Cytological method of their diagnostics.

Classification of hereditary illnesses of the person.

Chromosomal illnesses which are caused infringement of amount or structure of chromosomes, cytogenetic mechanisms, essence. Cytogenetical methods. The analysis karyotype of patients with hereditary illnesses. Definitions X-and Y-sexual chromatin as methods of diagnostics of hereditary illnesses of the person.

Topic 17. Molecular diseases. Biochemical method and DNA-diagnostics.

Monogenic (molecular) illnesses of the person which are caused change of molecular structure of a gene. Molecular illnesses carbohydrate, aminoacids, albuminous, lipid, a mineral exchange. The mechanism of their occurrence and principles laboratory prenatal diagnostics.

Genic engineering. Biotechnology. Concept about genic therapy.

Topic 18. Population-statistical method. Medical-genetic consulting.

Population-statistical method. The law of a constancy of genetic structure of ideal populations.

Use of the formula of the law of Hardy-Wineberg in medicine for definition of genetic structure of populations of people.

Medical-genetic aspects of family. Medical-genetic consultation. Preventive maintenance of a hereditary and congenital pathology. Prenatal diagnostics of hereditary illnesses.

Topic 19. Practical skills of substantial modules 2 and 3. “Laws of a heredity”, “Methods of human heredity studying. Hereditary diseases.”

Substantial module 4. Biology of individual development.

Specific goals:

- To treat features of a reproduction of the person in connection with its biosocial essence.
- To explain the mechanism of gametogenesis and to interpret characteristic distinctive features ovo- and spermatogenesis.
- To define features embrional developments of the person and to explain value of the genetic control of development of an organism of the person.

- To correlate the critical periods of embryogenesis of the person to its born defects
- | □ To treat value of a problem of differentiation on molecular-genetic, cellular and tissue levels of the organization alive.
- To apply the biogenetic law in its subsequent treatment to definition ontophylogenetically predetermined inborn defects.
- To treat features of postnatal period of individual development of the person in connection with its biosocial essence.
- To interpret modern theories and mechanisms of ageing, and also a problem of human lifetime.
- To define kinds of regeneration and its way, feature and value of regenerative processes at the person in system of its homeostasis.
- To classify kinds of transplantation of tissue of the person and to correlate process of transplantation at the person to system of its immunity.
- To correlate kinds of tumours of the person depending on types of tumoral growth.

Topic 20. Molecular-genetic mechanisms of ontogenesis. Characteristic of the human prenatal period. Ontogenesis disorder and their place in a human pathology.

Ontogenesis: types, the periods, stages. Stages embryonal developments of the person. Differentiation at molecular-genetic, cellular and tissular levels. Congenital developmental anomalies. Classification.

Regulation of function of genes in ontogenesis. Experimental studying embryonal developments. A problem of determination and interaction blastomeres. Embryonal induction.

Regulation during crushing and its infringements (twins, lacks of development, ugliness).

The critical periods of development. Teratogenesis. Factors of environment.

Topic 21. Postnatal period of ontogenesis. Biological mechanisms of organism homeostasis maintenance.

The periods postembryonal developments of the person.

Processes of growth and differentiation in postnatal the period of individual development of the person.

Features postnatal the period of individual development of the person in connection with its biosocial essence.

Concept about a biofield, biological rhythms and their medical value.

Kinds and ways of regeneration. Kinds of transplantation of tissues at the person. Old age as the closing stage ontogenesis the person. Theories of ageing.

Topic 22. Control of mastering of the module 2 “ Organismic a level of living organization. Bases of the human genetics.”

Approximate variant of test for module control.

Tests I level.

1. . What is the phenotype:
 - A. Set of external attributes of an organism;
 - B. Set of attributes and properties of an organism which are formed in process of ontogenesis;
 - C. Set of attributes which are genetically determined?
2. Some smoking people have tumor of lungs. What form of variability is shown in this case?
 - A. Modification,
 - B. Mutational,
 - C. Genotypical,
 - D. Combinative,
 - E. Casual, phenocopy,
 - F. Variability of genone.
3. What from the named illnesses are enzymopathies?
 - A. PKU;
 - B. Illness of Gurler;
 - C. homocystenuria;
 - D. talassemia;
 - E. diabetes
4. What from the listed illnesses are multifactorial?
 - A. PKU;
 - B. Illness of Gurler;
 - C. homocystenuria;

D. talassemia;

E. diabetes.

5. What from the named illnesses concern to polygenic?

A. PKU;

B. Illness of Gurler;

C. homocystenuria;

D. talassemia;

E. diabetes.

6. At the child of 6 months a delay of motor and mental development, light integuments, hair, an iris of the eye of eyes, positive test of Felling. What kind of hereditary disease the child have?

A. galactosemia

B. albinism;

C. homocystenuria

D. alkaptonuria

E. PKU

7. Tyrosinosis it is inherited as autosomal-recessive character. In family of healthy parents the sick child was born. What probability of a birth of the healthy child at this pair?

A. 0 %;

B. 25 %;

C. 50 %;

D. 75 %;

E. 100 %.

8. Person after 40 years have the pathology of joints of limbs and backbone, and also other parts of a body, in which a lot of a connecting protein has developed. What hereditary disease at the patient?

A. ahondroplasia

B. Illness of Gurler

C. mucopolysaccaridosis

D. alkaptonuria

E. syndrome of Marfan

9. How many allele genes (1, 2, 3, 4 or 100) encode haemoglobin?
- A. In a population;
 - B. in every human being in a somatic cell;
 - C. in a sex cell.
10. What interaction forms (dominance, incomplete dominance, co-dominance) are there between alleles?
- A. J^B and J^0 ;
 - B. J^A and J^0 ;
 - C. J^A and J^B .
11. What blood groups are possible in children if their parents have:
- A. I blood group;
 - B. II blood group;
 - C. III blood group;
 - D. IV blood group;
12. Determine all possible children's blood groups in such cases:
- A. Mother has I, father – II blood group;
 - B. mother has I, father – IV blood group;
 - C. mother has I, father – III blood group.
13. What embryonal rudiment it is formed joints and bone tissue?
- A. entoderma
 - B. mesoderma
 - C. somit
 - D. sclerotom
 - E. splanchnotom
14. What reasons of blastopathies?
- A. chromosomal aberrations;
 - B. cardiovascular diseases of mother;
 - C. influence of factors of environment;
 - D. hypoxia of foetus;
 - E. diabetes.

15. For what type of inheritance characteristic such features: the attribute is shown mainly for men; daughters and sons are healthy; daughters are sick approximately half of their sons, and their daughters are healthy:

- A. X-linked recessive;
- B. Y-linked;
- C. X-linked dominant;
- D. A-D;
- E. A-R?

16. Write out, at what syndromes (diseases) in leukocytes boys can have one drum-type stick:

- A. Down;
- B. Patau;
- C. Klenifelter;
- D. Trisomy X;
- E. Supermen;
- F. Albinism.

17. What from the listed definitions concern to the term of "probands":

- A. The sick person;
- B. The person for whom make a family tree;
- C. The person in relation to whom carry out the analysis of a family tree;
- D. Family with the sick child;
- E. The woman at whom it is possible to expect a birth of the child.

18. What quantity of sexual chromosomes at the woman, in leukocytes drum-type sticks are revealed:

- A. One;
- B. Two;
- C. Three;
- D. Are not revealed.

19. How many bodies of sexual chromatine it is found out in cells of the man with syndromes:

- A. Patau;
- B. Turner;
- C. Trisomy X;
- D. Klenifelter (48, XXX).

20. The man of high growth at which the bottom jaw is increased, differs aggressive, antisocial behaviour. Karyotype 47, XYY. As a result of what kind of a mutation has appeared such karyotype:

- A. Genome;
- B. Chromosomal;
- C. Generative;
- D. Somatic;
- E. Genic.

Test on II level.

1. What characters mentioned are inherited depending on the sex?
 - A. Haemophilia.
 - B. Baldness.
 - C. Color darkness.
 - D. Podagra
2. What characters mentioned are inherited as linked with the sex?
 - A. Primary sex characters.
 - B. Secondary sex characters.
 - C. Somatic characters.
 - D. Determined by autosomic genes.
3. What characters mentioned are inherited as linked with the sex?
 - A. Primary sex characters.
 - B. Secondary sex characters.
 - C. Somatic characters.
 - D. Determined by autosomic genes.
 - E. Determined by genes located in sex chromosomes.
4. How many allele genes (1, 2, 3, 4 or 100) encode haemoglobin?
 - A. In a population;

- B. In every human being in a somatic cell;
 - C. In a sex cell.
5. What interaction forms (dominance, incomplete dominance, co-dominance) are there between alleles?
- A. J^B and J^0 ;
 - B. J^A and J^0 ;
 - C. J^A and J^B .
6. What blood groups are possible in children if their parents have:
- A. I blood group;
 - B. II blood group;
 - C. III blood group;
 - D. IV blood group;
7. Determine all possible children's blood groups in such cases:
- A. Mother has I, father – II blood group;
 - B. Mother has I, father – IV blood group;
 - C. Mother has I, father – III blood group.
8. What gametes types are formed in individuals in such genotype?
- A. In individual with genotype AA.
 - B. With genotype Bb.
 - C. With genotype Cc. In individual with genotype Aabb.
 - D. In individual with genotype AaccDD.
9. What statement is a cytologic substantiation of third Mendel's law?
- A. Gene's localization in heterochromosome.
 - B. Gene's localization in one chromosome.
 - C. Gene's localization in non-homologic chromosomes.
 - D. Gene's localization in corresponding homologic chromosomes locuses.
10. What phenotype correlation in offsprings at analyzing crossing if individual analyzed is homozygous one?
- A. 1:1.
 - B. 3:1.
 - C. 1:1:1:1.

D. 9:3:3:1.

E. 1:2:1.

Tasks on medical genetic. (10 points)

1. The parents are Rh⁺, but the father is blue-eyed and the mother is brown-eyed. They have 5 children from which 4 are Rh⁺ but 2 are blue-eyed and 2 are brown-eyed. One child is blue-eyed and Rh⁻. Determine parents' and children's' genotypes (Rh⁺ and brown-eyedness are dominant characters).
2. Woman suffering from color blindness got married to man with normal sight. What will be the color perception in sons and daughters of these parents?
3. In medical-genetic consultation the healthy woman has addressed in connection with a birth of three children from two marriages with numerous congenital developmental anomalies and miscarriage. Cytogenetical research has established for proband infringement karyotype (45, XX, t (13q 13q)). Karyotypes parents of proband, and also sibs (the brother and the sister) normal. What genetic risk of a birth of the sick child? What prospects of application prenatal diagnostics?

Control questions (5 points)

1. Multiplied alleles. Blood groups inheritance on system ABO. Importance for medicine.
2. Prenatal diagnostic.

Maximum amount of points – 80

Minimum – 50

Approximate list of control questions.

Module 2. Organismic a level of living organization. Bases of the human genetics.

Substantial module 2. Laws of a heredity and variability.

1. Subject and tasks of human genetics and medical genetics.
2. Genotype and phenotype.
3. Laws of inheritance at monohybrid crossing. G.Mendel's first and second laws. Mendel's traits. Monogenic diseases.
4. Laws of inheritance at di- and polyhybrid crossing. G.Mendel's third law.
5. Plural alleles. Inheritance of human blood groups according to the antigenic system ABO and a Rhesus-factor. Value for medicine.

6. Allele genes interactions: full dominance, incomplete dominance, co-dominance.
7. Non-alleles genes interactions: complementary, epistasis.
8. Polymeric inheritance of human traits. Pleiothropy.
9. Linked inheritance of genes (Morgan's law). Crossing over.
10. Chromosomal theory of a heredity.
11. Modern condition of research human genomes. Genetic engineering. Genetic maps of the human chromosomes.
12. Genetics of a sex. A doze of genes. Chromosomal diseases, which amounts of sexual chromosomes caused by change.
13. Inheritance of the characters linked to a sex.
14. Variability, its forms, value in onthogenesis and evolutions.
15. Modification variability, its characteristic. Norm of reaction. Phenocopies.
16. Penance and expressivity of the genes.
17. Genotypic variability, its forms. Combinative variability. Mechanisms of occurrence and value.
18. Mutational variability and its phenotype of display. Classification of mutations according to the genotype. Spontaneous and induced mutations.
19. Genic mutations, mechanisms of occurrence. Concept about monogenic deseases.
20. Chromosomal aberrations. Mechanisms of occurrence and examples of diseases which are their consequence.
21. Mechanisms of genome mutations (polyploid, gaploid, polysoma, monosoma).
22. Hereditary diseases which are consequence of disorder autosom's quantity and sexual chromosomes.
23. Mutations in sexual and somatic cells, their value. Mosaicism.
24. Mutagen factors, their types. Mutagenesis. Genetic monitoring.
25. Diseases with hereditary predisposition. Concepts about multifactorial diseases.

Substantial module 3. Methods of studying of the human heredity.

Hereditary diseases.

26. Methods of studying of the human heredity. The person as specific object of the genetic analysis.

27. Genealogic and twins methods of studying of the human heredity.
28. Biochemical method of studying of hereditary diseases. Screenings - programs.
29. Cytogenetic method of studying of the human heredity.
30. Prenatal diagnostics of hereditary diseases.
31. Medical-genetic aspects of family. Medical-genetic consultation.
32. Population-stylistic a method of studying of the human heredity

Substantial module 4. Biology of individual development.

33. Duplication – universal property alive. Forms of duplication. An opportunity of cloning of organisms.
34. Gametogenesis: spermatogenesis, ovogenesis. Sexual cells of the person.
35. Fertilisation. Features of a reproduction of the person.
36. Ontogenesis, its periods.
37. Embryonic development, its stages. Provisory organs.
38. Molecular and cellular mechanisms of differentiation.
39. Differentiation of germinal lists and tissues. Embryonic induction. Cloning of the organism and tissues.
40. Critical periods of the embryonic human developments. Teratogenous factors of environment.
41. Born lacks of development, their modern classification: hereditary, exogenous, multifactorial; embryopaty and phetopaty; phylogenetic caused and not phylogenetic.
42. Postembryonal human development and its periods. Neurohumoral regulation of growth and development.
43. Ageing as a stage ontogenesis. The theory of ageing. Concept about gerontology that geriatrics.
44. Clinical that biological death.
45. Regeneration of bodies and tissues. Types of regeneration. Value of a problem of regeneration in biology and medicine.
46. Features and value of regenerative processes at the person. Typical and atypical regeneration. Tumoral growth.

47. A problem of transplantation of bodies and tissues. Types of transplantation. Tissues incompatibility and ways of its overcoming.

48. Concepts about a homeostasis. Mechanisms of regulation of a homeostasis at different levels of the organization of a life.

Module 3. Population-species, biogeocenotical and biospheric levels of living organization.

Substantial module 5. Medical and biologic bases of parasitism. Medical protozoology.

Specific aims:

- To define concept "parasitism", " parasitic system ", "source of invasion", " the factor of transfer of activators of invasion ".
- To classify parasites on obligate and facultative, constant and temporal, specific and nonspecific, external and internal.
- To interpret morphophysiological adaptations of the protozoa to the parasitism.
- To explain belonging of parasitic illnesses of the person to group of transmissional.
To identify final, intermediate, obligate, facultative and reservoir owners of the protozoa.
- To explain influence of modern world migratory processes of the population on distribution protozoan invasion in Ukraine.
- To define methods of laboratory diagnostics protozooosis, proceeding from localization and life cycles of the protozoa.
- To correlate cycles of development of the protozoa and ways of infection on protozooosis with definition of means of prevention of disease on them.
- To treat biological principles of work with transmissional diseases.

Structure of credit-module 3 . Population-species, biogeocenotical and biospheric levels of living organization.

Lecture plan

Module 3. Population-species, biocenotical, biospheric levels of living organization.		
Substantial module 5. Medical-biological basis of parasitism. Medical protozoology.		
11	Medical-biological basis of parasitism. Protozoa – parasites of human.	2
Substantial module 6. Medical helminthology.		
12- 13	Flat worms and Nematodes - human parasites.	4
Substantial module 7. Medical arachnoentomology.		
14	Medical arachnoentomology. Arachnida - pathogens and vectors of many infectious diseases.	2
Substantial module 8. Relating individual and historical development. Biosphere and the man.		
15	Synthetic theory of evolution. Features of action of evolutionary factors in human population. Biosphere as a system, which provides human being.	2
	In total	10

Plan of practical classes

Substantial module 5. Medical and biologic bases of parasitism. Medical protozoology.

23.	Sarcomastigophora. Amoeba (Lobosea.)	2
24.	Zoomastigophora – human parasites.	2
25.	Apicomplexa. Representatives of Sporozoea – human parasites. Ciliary (Ciliophora). Representatives of a class – human parasites of the person.	2

Substantial module 6. Medical helminthology.

26- 27.	Medical helminthology. Flat worms – human parasites. Flat worms (Plathelminthes). Trematoda – activators of human diseases.	4
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28-29.	Flat worms (Plathelminthes). Tape worms (Cestoidea) – activators of human diseases.	4
30-31.	Nemathelminthes – parasites of the person. Nematoda – activators of human diseases.	4
32.	Laboratory diagnostics of gelminthosis.	2
33.	Practical skills of substantial modules 5 and 6. ” Medical protozoology ” and “ Medical helminthology”.	2

Substantial module 7. Medical arachnoentomology.

34.	Medical arachnoentomology. Arthropods (Arthropoda) activators and carriers of activators of infections and invasion. Arachnoidea. Ticks (Acarina) – activators of human diseases.	2
35.	Insecta: Anoplura, Aphaniptera, Hemiptera, Blattoidea – activators of human diseases.	2
36.	Insecta: Diptera – activators of human diseases.	2

Substantial module 8. Interrelation individual and historical development.

Biosphere and the man.

37.	Synthetic theory of evolution. Population structure of mankind.	2
38.	Phylogenesis of the basic systems of bodies Chordata.	2
39.	Biosphere as system which provides the human existence. Bases of the general ecology and human ecology.	2
40.	Control of mastering of the module 3. ” Population-specific, biogeocenotical and biospheric levels living organization”.	2
	In total	36

Thematic plan of self-preparation work

Module 3. Populational-specific, biogeocenotical and biospheric levels of the organization of a life. Substantial module 5. Medical and biologic bases of parasitism. Medical protozoology.		
1.	Preparation for practical class - theoretical preparation and working off of practical skills	2
2.	Working off the topics which not included into the plan of class.	
	Methods of laboratory diagnostics of the diseases caused by the parasitic elementary	1
	In total	3
The substantial module 6. Medical helminthology.		
1.	Preparation for class - theoretical preparation and working off of practical skills	4
2.	Working off the topics which not included into the plan of class.	
2. 1	Blood suckers- activators of parasitic illnesses of the person.	1
2. 2	Rishta and fillaria - activators of diseases of the person	1
3	Preparation for delivery of practical skills of substantial modules 5 and 6	3
	In total	9

The substantial module 7. Medical arachnoentomology.		
1.	Preparation for practical class - theoretical preparation and working off of practical skills	3
2.	Working off the topics which not included into the plan of class.	
2. 1	Ticks inhabitants of habitation of people and their medical value	0,5
2. 2	Midges and its components: the characteristic, value of intermediate owners of helminths and carriers of activators of illnesses of the	0,5

	person	
	In total	4
The substantial module 8. Interrelation individual both historical development.		
Biosphere and the person		
1.	Preparation for practical class - theoretical preparation and working off of practical skills	3
2.	Working off the topics which not included into the plan of class.	
2. 1	Origins of the person. Human races as reflections of adaptable laws of development of the person	1
2. 2	Plants poisoning for the person and animals	1
3	Preparation for the control of mastering of the module 3	3
	In total	8

Division of points given to students

No	Module 2	Amount of points
1.	<i>Substantial module 5</i>	21
	Theme 23	7
	Theme 24	7
	Theme 25	7
2.	<i>Substantial module 6</i>	49
	Theme 26	7
	Theme 27	7
	Theme 28	7
	Theme 29	7
	Theme 30	7
	Theme 31	7
	Theme 32	7

3.	<i>Substantial module 7</i>	21
	Theme 33	7
	Theme 34	7
	Theme 35	7
4.	<i>Substantial module 8</i>	28
	Theme 36	7
	Theme 37	7
	Theme 38	7
	Theme 39	7
	<i>Time Substantial module</i>	119
	Theme 40	80
	<i>Preparation of the review of the scientific literature, etc. individual work</i>	1
	In total	200

Topic 23. Medical and biologic bases of parasitism. Medical protozoology.

Protozoa. Sarcomastigophora. Amoeba (Lobosea.)

The introduction into medical parasitology. An origin and evolution of parasitism. Principles of classification of parasites. Principles of interaction of the parasite and the owner.

Morphophysiological adaptation of parasites.

Concept about intensity and extensiveness invasions. Outstanding scientists: V.O. Dogel, V.M. Beklemishev, E.N. Pavlovsky, K.I. Skrjabin, O.P. Markevich, L.V. Gromashevsky, etc. Prominent features and classification the Elementary (Protozoa).

Type Sarcomastigophora, a class of the Amoeba (Lobosea). A dysenteric amoeba (*Entamoeba histolytica*), an intestinal amoeba (*E. coli*), an oral amoeba (*E. gingivalis*).

Medical geography, morphofunctional features, cycles of development, a way of infection, laboratory diagnostics, preventive maintenance amoebiasis.

Topic 24. Zoomastigophora – human parasites.

Medical geography, morphofunctional features, cycles of development, a way of infection, laboratory diagnostics and preventive maintenance.

Topic 25. Apicomplexa. Representatives of Sporozoea – human parasites. Ciliary (Ciliophora). Representatives of a class – human parasites of the person.

Medical geography, morphofunctional features, cycles of development malarial plasmodium and toxoplasma. Ways of infection, laboratory diagnostics and preventive maintenance of the diseases caused by them. Methods of laboratory diagnostics of the diseases caused by the parasitic Protozoa.

Substantial module 6. Medical helminthology.

Specific aims:

To explain concept helminths, bio- and geohelminths, helminthiasis, autoinvasion, autoreinvasion, retroinvasion.

To treat mutual relations in biological system " the parasite - the owner ", and to interpret morphophysiological adaptations helminths to the parasitism.

To explain influence of modern world migratory processes of the population on distribution helminthiasis in Ukraine.

To identify final, intermediate and reservoir owners of helminths.

To define methods of laboratory diagnostics of helminthiasis, proceeding from localization and life cycles of helminths.

To correlate cycles of development of helminths and ways of infection of helminthiasis to definition of means of prevention of disease.

To define belonging of parasitic diseases of the person to the group of transmissional.

Topic 26-27. Medical helminthology. Flat worms – human parasites. Flat worms (Plathelminthes). Trematoda – activators of human diseases.

Medical geography, morphofunctional features, cycles of development, a way of infection, pathogenic influence, laboratory diagnostics and preventive maintenance.

Blood suckers - activators of parasitic illnesses of the person.

Topic 28-29. Flat worms (Plathelminthes). Tape worms (Cestoidea) – activators of human diseases.

Medical geography, morphofunctional features, cycles of development, a way of infection pathogenic influence, laboratory diagnostics and preventive maintenance.

Topic 30-31. Nemathelminthes – parasites of the person. Nemathelminthes. Nematoda – activators of human diseases.

Medical geography, morphofunctional features, cycles of development, a way of infection, pathogenic influence, laboratory diagnostics and preventive maintenance.

Topic 32. Laboratory diagnostics of gelminthosis.

Principles and the contents of the basic macro-and microhelminthoscopes researches of excrements, water, a ground, etc. Features of a structure of eggs suckers, tape and round worms - parasites of the person. K.I.Skrjabin's.

Topic 33. Practical skills of substantial modules 5 and 6.

” **Medical protozoology** ” and “ **Medical helminthology**”.

Substantial module 7. Medical arachnoentomology.

Specific aims:

To interpret concept about specific and mechanical carriers of activators of infectious diseases.

To compare value of arthropods as activators and carriers of activators of infectious diseases.

To correlate value trasovarial and transphasional transfers of activators of infectious diseases with their prevalence in populations of people.

Topic 34. Medical arachnoentomology. Arthropods (Arthropoda) activators and carriers of activators of infections and invasion. Arachnoidea. Ticks (Acarina) – activators of human diseases.

Features of morphology, a feed and life cycle. Arachnida. Poisoning Arachnida (scorpions, spiders). Medical value of ticks - activators of illnesses and carriers of activators of diseases of the person.

Ticks - inhabitants of habitation of people and their medical value.

Topic 35. Insecta: Anoplura, Aphaniptera, Hemiptera, Blattoidea – activators of human diseases.

Progressive and regressive changes in the organization of a class Insects (Insecta) depending on environment of existence. Features of morphology, a feed and life cycle of insects. Medical value of lice, fleas, bugs, cockroaches as activators and carriers of activators of infectious diseases.

Topic 36. Insecta: Diptera – activators of human diseases.

Mosquitoes, flies, mosquitoes, their medical value. Midges and its components: the characteristic, value as intermediate owners Helminthes and carriers of activators of illnesses of the person.

Substantial module 8. Interrelation individual and historical development.

Biosphere and the man.

Specific aims:

- . To treat concept about populations of people as object of influence of evolutionary factors.
- . To explain the synthetic theory of evolution as one of stages of development of the evolutionary doctrine.
- . To interpret a problem genetic burdened in populations of people and its medical and biologic consequences.
- . To treat concept about biosphere as complete natural system, its human component.
- . To interpret value of ecology of the person as directions in system of biological sciences, theoretical basis of development of actions of nature's protect and health of the population, rational using of natural resources.
- . To define social and biological aspects of adaptation of the population to the conditions of a life and formation adaptive human ecotypes.

To explain occurrence of psychological constitutional types of people ("sprinter", "stayer", "mixed") concerning adaptation to the new or extreme conditions of environment.

To treat anthropogenous environmental contamination (atmospheres, hydrospheres, lytosphaera) emissions of industrial production, vehicles, and also chemical substances which are used in an agriculture as an original cause of occurrence of professional, allergic and other diseases of the person.

Topic 37. Synthetic theory of evolution. Population structure of mankind.

The synthetic theory of evolution. Features of action of evolutionary factors in populations of people. Doctrines about macro- and microevolution. The biogenetic law. Populational structure of mankind.

Origin of the person. Human races as reflection of adaptable laws of development of the person.

Topic 38. Phylogenesis of the basic systems of bodies Chordata.

Evolution of the basic systems of organs Chordata. Ontophylogenetical caused congenital developmental anomalies of the person.

Topic 39. Biosphere as system which provides the human existence.

Bases of the general ecology and human ecology.

Structure and functions of biosphere. Substantive provisions of the doctrine of V.I. Vernadskiy about the organization of biosphere. Modern concepts of biosphere. A noosphere. Mankind as active geological force. Protection of biosphere in national and international scientific programs.

Ecology of the person. Environment as ecological concept. Kinds of environments. Factors of environment. Unity of an organism and environment. Kinds of ecosystems. Penetration of the person in biocenosis, formation of antropocenosis. Anthropogenous migration of elements. Ecological forecasting. Healthy (comfortable), unhealthy (discomfortable), extreme environments. Adequate and inadequate conditions of environment. Adaptation of people to extreme conditions.

Influence of anthropogenous factors of environmental contamination on health of the population.

The characteristic of plants poisoning for the person and animals.

Topic 40. Control of mastering of the module 3. ” Population-specific, biogeocenotical and biospheric levels living organization”.

Approximate variants for the final control module.

Tests of 1 level (1 point)

1. During scheduled inspection of schoolboys at the girl of 10 years, in scrape of perianal folder are found out the colorless asymmetric oval eggs with larva inside.

Specify the disease

- A. Amoebiasis|.
- B. Ascariasis.
- C. Enterobiasis.
- D. Trichocephaliasis.
- E. Ancylostomiasis.

2. In hospital has got the man, 35 years, which| has lost sight on one eye. From the anamnesis the doctor has learned found out that the patient frequently uses pork. After X-ray and carrying out of immunological reactions it is diagnosed cystecercosis. Call the helmint - activator of this disease?

- A. Taeniarhynchus saginatus.
- B. Taenia solium.
- C. Trichocephalus trichiurus.
- D. Trichinella spiralis.
- E. Diphyllbothrium latum.

3. In spit| of patient from the hospital with preliminary diagnosed pneumonia, the larva of helminths have found out| which belong to the type of Round worm. What helmint is it?

- A. Liver fluke.
- B. Lung fluke.
- C. Ascaris.
- D. Pork tapeworm.

- E. Echinococcus.
4. To the patient after inspection the put diagnosis fascioliasis|. Infection has taken place after using:
 - A. Unboiled water from a pond
 - B. Crabs
 - C. The infected fish.
 - D. Infected liver.
 - E. The infected meat.
 5. After inspection the patient has got diagnosis opisthorhosis. What way of infection?
 - A. Through the dirty vegetables.
 - B. Through the dirty hands.
 - C. Using of insufficiently thermally processed fish.
 - D. Using the liver of sick animals.
 - E. Using infected beef.
 6. The patient has addressed to the doctor - urologist with complaints to a pain at urination. In the urine taken on the analysis, were found out the eggs with a characteristic thorn but in the urine taken in the afternoon. Also it has been established, that the patient has returned from | Australia. What diagnosis can for be put?
 - A. Shistosomiasis intestinal.
 - B. Shistosomiasis Japanese.
 - C. Shistosomiasis urogenital.
 - D. Opisthorhosis.
 - E. Dicroceliosis.
 7. In the market father has bought the pork. What illness can catch the members of family from meat which has not passed the veterinary control?
 - A. Fascioliasis
 - B. Taeniarinosis
 - C. Hymenolepiasis
 - D. Echinococcosis
 - E. Taeniasis
 8. In the patient are found out the intestinal impassability, bad appetite, nausea,

vomiting |. The anemia connected with the lack of Vitamin B12. What parasite could be cause of this pathology?

- A. Beef tapeworm
- B. Dwarfish tapeworm
- C. Echinococcus
- D. Trichocephalus (whipworm)
- E. Alveococcus

9. In result of sting of mosquitoes on skin of the person there were ulcers. The analysis of the contents of ulcers has found out endocellular unflagella. What disease has the patient?

- A. Leishmaniasis visceral.
- B. Demodicosis.
- C. An itch.
- D. Cutaneous leishmaniasis.
- E. Miasis.

10. In the some regions of the world were distributed cases of disease on a malaria. What insects are biological carriers of the activator of this disease?

- A. Mosquitoes of Culex.
- B. Mosquitoes of Phlebotomus.
- C. Midges of Simulium.
- D. Mosquitoes of Anopheles.
- E. Mosquitoes of Aedes.

11. To the doctor the patient has addressed with disorders of functions of digestion, often diarrhea, with impurity of blood, complains of the general weakness, pain in intestines. The laboratory analysis feces has shown presence of vegetative forms of the protozoa which have the changeable form of a body, the cytoplasm contain the erythrocytes. Call the name of this Protozoa.

- A. Lamblia.
- B. Balantidium intestinal.
- C. An amoeba intestinal.

- D. The trichomonad intestinal.
 - E. Dysenteric amoeba.
12. To the hospital the patient with an inflammation of biliary tract has addressed. In portions of bile are found out the mobile Protozoa pear-like forms, 2 nucleus, with 4 pairs of flagella. What protozoan disease is diagnosed for the patient?
- A. Lambliasis.
 - B. Toxoplasmoniasis.
 - C. Balantidiasis.
 - D. Trichomoniasis.
 - E. An amoebic dysentery.
13. To the infectious branch of hospital the patient with attacks of fevers accompanied by rise in temperature of a body up to 40 °C. These attacks rhythmically repeat each 48 year|. From the anamnesis it is known, that the patient recently has returned from the countries of Southern Africa. He was there about three years. What probable activator of this disease?
- A. The activator of African trypanosomiasis|.
 - B. The activator of lambliasis.
 - C. The activator of four-day malaria.
 - D. The activator toxoplasmoniasis.
 - E. The activator three-day Malaria.
14. During microscopy of feces smear the 8-nuclear cysts found out. Call the Protozoa.
- A. Balantidium intestinal.
 - B. An amoeba intestinal.
 - C. Lamblia.
 - D. The trichomonad intestinal.
 - E. Toxoplasma.
15. To the Kiev zoo were delivered antelopes from Africa. In her blood Trypanosoma brucei gambiense is found out. Can be these animals dangerous?
- A. Dangerous to animals and for person.
 - B. Dangerous only for the person.
 - C. Do not make epidemiological danger.

- D. Dangerous to other antelopes.
- E. Dangerous only for predators.

16. To the doctor the patient addressed, which has ulcers are not healed. Recently sick patient has arrived from Turkmenistan. The doctor has established the diagnosis: skin leishmaniasis. What way the activator of this illness has got:

- A. Transmissional.
- B. Air-drops.
- C. Contact-household.
- D. Sexual.
- E. Alimentary.

17. During operation on appendix the helminths found out, white color, length of 40 mm with thin thread-like form on the end. During previous inspections in excrements of the patient are found out the oval eggs with kegs-like form on poles. Which helminth has been found out during operation?

- A. Ancylostoma
- B. Enterobius (pinworm).
- C. Ascaris.
- D. Trichocephalus (whipworm)
- E. Strongiloides stercoralis

18. Working women of a cattle-breeding farm the doctor has established previous diagnosis: Echinococcosis . The diagnosis is confirmed during surgical intervention. From what animal the patient could catch Echinococcosis?

- A. Sheeps.
- B. Pigs.
- C. Dogs.
- D. The rabbit.
- E. Cows.

19. Choose from the term named the most true definition of "Midges".

- A. Set of blood-sucker Insects;
- B. Set flying Insects;
- C. Set dipterous Insects;

- D. Set dipterous flying Insects;
- E. Set of mosquitoes, flies, butterflies.

20. In 1910 in the Odessa port by the ship, which has arrived from Delhi, rats – reservoir owners of bacteria - activators of a plague have casually been delivered. What insects were carriers of activators of this illness from rats to the person?

- A. Mosquitoes;
- B. Fleas;
- C. Flies;
- D. Bugs;
- E. Lice.

Test II level (2 points)

The test 2 levels (2 points|бал)

1. Which Flat worm have not the digestive system:

- A. *Dracunculus medinensis*
- B. *Echinococcus granulosus*
- C. *Fasciola hepatica*
- D. *Hymenolepis nana*
- E. *Opisthorhis felinus*
- F. *Diphyllobothrium latum*
- G. *Taenia solium*
- H. *Taeniarhynchus saginatus*

2. Call the helminths which have life cycle with two intermediate hosts:

- A. *Dracunculus medinensis*
- B. *Echinococcus granulosus*
- C. *Fasciola hepatica*
- D. *Hymenolepis nana*
- E. *Opisthorhis felinus*
- F. *Diphyllobothrium latum*
- G. *Taenia solium*

H. Taeniarhynchus saginatus

3. Call the helminths-parasitize in intestines of the person:

- A. Ascaris lumbricoides
- B. Echinococcus granulosus
- C. Fasciola hepatica
- D. Hymenolepis nana
- E. Opisthorhis felinus
- F. Diphyllbothrium latum
- G. Taenia solium
- H. Taeniarhynchus saginatus
- I. Trichocephalus trichiurus

4. Specify what kind of helminths the doctors more often face:

- A. Alveococcus multilocularis
- B. Ascaris lumbricoides
- C. Echinococcus granulosus
- D. Fasciola hepatica
- E. Hymenolepis nana
- F. Opisthorhis felinus
- G. Diphyllbothrium latum
- H. Taenia solium
- I. Taeniarhynchus saginatus
- J. Trichocephalus trichiurus

5. What systems of internal organs are absent in Cestoidea:

- A. Genitourinary
- B. Nervous;
- C. Blood;
- D. Sexual;
- E. Respiratory;

6. Specify which kind of helminthosis it is possible to be ill after using the pork, which containsinvasive larva:

- A. Cystecercosis
- B. Ascariasis
- C. Trichinosis
- D. Balantidiasis
- E. Teniasis
- F. Hymenolepidosis

7. Which kind of helminthosis the personal hygiene, cleanliness of water and meal is one of the basic preventive actions:

- A. Fillariasis
- B. Schistosomiasis
- C. Cystecercosis
- D. Ascariasis
- E. Trichinosis
- F. Balantidiasis
- G. Teniasis
- H. Hymenolepidosis

8. What representatives of amoebas can cause primary amoebic meningoencephalitis:

- A. Dysenteric amoeba;
- B. Naegleria
- C. Acanthamoeba
- D. Hartmanella
- E. Oral amoeba.

9. The person catches of American trypanosomiasis by:

- A. Contact-household;
- B. Contaminative
- C. Percussional
- D. Transmissional
- E. Sting of the fly tse-tse
- F. Sting mosquito Phlebotomus
- G. Sting of the Bugs

10. What organs and cells of bodies of the person can damages toxoplasma:

- A. Cells of reticula-endotelium systems
- B. Cells of liver, kidneys, spleen;
- C. Nervous cells of brain and spinal cord;
- D. Cells of heart and muscles;
- E. Cells of lung;
- F. Cells of lymph nodes;
- G. Blood cells.

In total 20 points

Situational tasks (8 points):

1. At the person, that has visited Indochina (in a countryside) some months ago the fever, rash is observed on the skin, an itch, a local hypostasis, an inflammation lymph nodes. What helminthosis can be provided?
2. To hospital the family with attributes of a poisoning has arrived: a pain in a stomach, a strong diarrhoea and nausea, thirst, spasmes of muscles. Attributes of a poisoning were showed after 10 hours of use of mushrooms, which had white cap as a handbell, diameter 10-12 mm. What mushrooms was cause a poisoning?
3. During preventive review of the staff of children's establishment and workers of public catering at one of working women the lambliosis it is found out and at the second - a urinogenital trichomoniasis. Can the women be epidemiological dangerous? What preventive measures need to be accepted?

Practical skills - up to 6 points

Control questions (on 5 points):

1. Parasitism. Principles of interaction to the parasite and the owner at a level of individuals. Ways of morpho-physiologic adaptation of parasites.
2. Influence of mutational process, migration, isolation and drift of genes on genetic structure of populations of people. Specificity of action of natural selection in human populations.

In total 80 points (the maximal estimation with the module)

Approximate list of control questions

Module 3. Population-species, biogeocenotical and biospheric levels of living organization.

Substantial module 5. Medical-biological bases parasitism. Medical protozoology.

1. Parasitism. Principles of interaction of parasitism and the owner at a level of an individual. Ways morphophysiological adaptations of parasites.
2. Transmission diseases. Facultative - transmission and obligative-transmission diseases. Specific and mechanical carriers of activators of diseases.
3. Principles of classification parasites: obligative, facultative, time, endo- and ectoparasites.
4. Life cycles of parasites. Alternation of generations and a phenomenon of change of owners. Intermediate and basic owners. Reservoir, obligative, facultative owners.
5. Diseases connected to the natural environment. Structure of the natural environment. The doctrine of academic E.N.Pavlovsky about centre of parasitic diseases. Concept about anthroponoze and zoonoze.
6. Bases of preventive maintenance of parasitic diseases. Methods of preventive maintenance: biological, ecological, public, etc.
7. Protozoa. Classification, characteristic features of the organization, value of representatives in medicine.
8. Lamblia. Morphology, ways of infection, methods of laboratory diagnostics, preventive maintenance.
9. Trichomonads. Regular position, morphology, a cycle of development, a way of infection, a substantiation of methods of laboratory diagnostics.
10. Biology of activators of Leishmaniasis. Regular position, morphology, a substantiation of methods of laboratory diagnostics and preventive maintenance.
11. Activators Trypanosomas. Regular position, morphology, a substantiation of methods of laboratory diagnostics, preventive maintenance.
12. Dysenteric amoeba. Regular position, morphology, a cycle of development, a substantiation of methods of laboratory diagnostics, preventive maintenance.

13. *Balantidium coli*. Regular position, morphology, a cycle of development, a way of infection, a substantiation of methods of laboratory diagnostics.
14. *Plasmodium malariae*. Regular position, a cycle of development, struggle against a malaria, problems antimalarial services at a modern level. Types of *Plasmodium malariae*.
15. *Toxoplasma*. Regular position, morphology, a cycle of development, a way of infection, a substantiation of methods of laboratory diagnostics.

Substantial module 6. Medical helminthology.

1. Phylum Flat worm. Classification, the main feature, medical importance of species.
2. Terms bio- and geohelminths.
3. *Fasciola hepatica*. Classification, life cycle, main feature, medical importance of species.
4. *Opisthorhis felinus*. Classification, life cycle, main feature, medical importance of species.
5. Diagnostic, prophylaxis of diseases.
6. *Paragonimus ringeri*. Classification, life cycle, main feature, medical importance of species.
7. Diagnostic, prophylaxis of diseases.
8. *Clonorchis sinensis*, *Dicrocoelium lanceatum*. Morphology, life cycle.
9. *Taenia solium*, classification, life cycle, main feature, medical importance of species.
Diagnostic, prophylaxis of diseases.
10. *Taenirhynchus saginatus*, Classification, life cycle, main feature, medical importance of species.
Diagnostic, prophylaxis of diseases.
11. *Cystisercosis*. Way of infection, prophylaxis.
12. *Hymenolepis nana*. Classification, life cycle, main feature, medical importance of species.
Diagnostic, prophylaxis of diseases.
13. *Alveococcus*, *echinococcus*. Classification, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.

14. *Diphyllobothrium latum*, Morphology, life cycle.
15. Phylum Round worm. Classification, the main feature, medical importance of species.
16. *Ascaris lumbricoides*, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
17. *Enterobius vermicularis*, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
18. *Trichocephalus trichiurus*, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
19. *Ancylostoma*. Life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
20. *Trichinella spiralis*, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
22. *Dracunculus medinensis*, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
23. *Filaria*, life cycle, main feature, medical importance of species. Diagnostic, prophylaxis of diseases.
24. Diagnostic of helminthosis.

Substantial module 7. Medical arachnoentomology.

1. Arthropods (Arthropoda) activators and carriers of activators of infections and invasion. Arachnoidea. Ticks (Acarina) – activators of human diseases.
2. Molluscs, Crustacea. Medical importance.
3. Acari, Acarina. Medical importance.
4. Acari, Acarina – carrier of diseases.
5. Flies, activators and carriers of activators of infections.
6. Insecta. Activators and carriers of activators of infections.
7. Mosquitoes. Medical importance.

8. Lice. Medical importance.
9. Fleas. Medical importance. Bugs, its kinds.

Substantial module 8. Interrelation individual and historical development.

Biosphere and the man.

1. The synthetic theory of evolution. Features of action of evolutionary factors in populations of people.
2. Macro- and microevolution.
3. Populational structure of mankind.
4. Problem and medical and biologic consequences genetic of burdened and influences of mutagen factors (radiating and chemical) on a population of people. Functional types of reaction of people on factors of environment ("sprinter", "stayer", "mixed").
5. The doctrine of academician B. I. Vernadsky about biosphere and a noosphere. Alive substance and its characteristics.
6. Medical and biologic aspects of influence of biosphere on health of the person. Concept about biofields and biological rhythms, their medical value.
7. Interrelation onto- and phylogenesis. The biogenetic law (F.Mjuller, E.Gekkel), O.G.Severtsev.
8. Laws of Phylogenesis as systems of organ. Evolutionary morphology and its methods. Ways of evolutionary transformations of organs. Rudiments.
9. Ontophylogenetical preconditions of inborn defects. Developments of organs and systems of organs of the person.
10. Phylogenesis of covers of Chordata organs. Inborn defects.
11. The comparative review of skeleton structures.
12. Phylogenesis of digestive systems of Chordata. Inborn defects which have ontophylogenetical conditionality.
13. Phylogenesis of respiratory system.
14. An origin of the person. The basic stages of anthropogenesis.
15. Position of kind *Homo sapiens* in system of fauna. Qualitative originality of the person. Ratio biological and social factors in process of anthropogenesis.

16. An origin of human races as display of adaptable laws of development of the person. Unity of mankind.
17. Ecology. Environment as ecological concept. Kinds of environment. Ecological factors. Unity of an organism and environment.
18. Biological variability. People in connection with biogeographical features of environment. Formation adaptive ecotype.
19. The person as ecological factor. The basic directions and results of anthropogenous changes of environment. Preservation of the environment.
20. Features ecological conditions in Ukraine.
21. Poisonous plants for the person and animals.

Approximate list of practical skills

- Technics of microscope
- To produce temporal micropreparations;
- To differentiate components of cells;
- To make ideogram chromosomes of the person;
- To identify primary structure, amount of amino acids, molecular weight of polypeptide
- To analyse sequence of stages of regulation genes expression;
- To define type of inheritance of Mendel attributes of the person;
- To provide genotypes and phenotype of offsprings;
- To exclude paternity at definition of groups of blood of parent;
- To analyze complex mechanisms of inheritance of attributes at the person;
- To develop actions for decrease in a degree of display of a pathological condition at patients with a hereditary pathology;
- To choose corresponding methods of studying of a heredity of the person for diagnostics different hereditary illnesses;
- To calculate probability of display of hereditary illnesses of offsprings depending on gene penetrance;
- To differentiate chromosomal illnesses of the person;
- To construct and carry out the genealogic analysis of family trees with hereditary illness;

- To calculate a role of a heredity and conditions of environment in development of attributes (twins method);
- To calculate genetic structure of populations of people;
- To apply the biogenetic law to definition ontophylogenical predetermined inborn defect of the person;
- To compare mechanisms of occurrence inborn defects of the person according to the different genesis;
- To acquire basic principles of regeneration and transplantation;
- To define a place of biological object in system of wildlife;
- To define belonging of parasitic illnesses of the person to the group of transmissional
- To diagnose on macro-and micropreparations of activators and carriers of activators of parasitic illnesses;
- To define a specific belonging of activators of protozoosis;
- To identify different stages of life cycle of parasites of the person;
- To define methods of laboratory diagnostics of parasitic illnesses;
- To define specific belonging of helminths and their eggs;
- To differentiate the diagnosis of invasion with the help of laboratory methods;
- To define a specific belonging carriers of activators of infections.
- To lead up the efficiency of methods of preventive maintenance of parasitic illnesses, being based on ways of infection with them;
- To provide influence of factors of an environment on an organism of the person.

Approximate preparations

which is necessary to define during the final control of mastering of knowledge over discipline

1. Lambliia
2. Trichomonad urogenital
3. Amoeba dysenteric
4. Malarial plasmodium
5. Toxoplasma

6. Hepatic sucker
7. Cat's (Siberian) sucker
8. Mature proglottide armed helminths
9. Mature proglottide unarmed helminths
10. Bladder of armed helminths
11. Bladder unaided helminths
12. Dwarfish helminths
13. Bladder of echinococcus
14. Mature proglottide *Diphyllobothrium latum*
15. *Ascaris lumbricoides*
16. *Enterobius vermicularis*
17. *Trichocephalus trichiurus*
18. *Ancylostoma*
19. *Trichinella spiralis* |
20. Spider
21. Tarantula
22. Scabby
23. Demodex
24. The dog (taiga) tick
25. Village tick
26. Larva of| Ticks
27. Head lice
28. Body lice
29. Crab lice
30. Human flea
31. Bug bed
32. Eggs of malarial mosquitoes
33. Eggs of not malarial mosquitoes
34. Larva malarial mosquitoes
35. Larva not malarial mosquitoes
36. Forms of malarial mosquitoes

37. Forms of not malarial mosquitoes
38. The head of female malarial mosquitoes
39. The head of male malarial mosquitoes
40. The head of female not malarial mosquitoes
41. The head of male not malarial mosquitoes
42. Mosquito

System and forms of current and final controls

The current control is carried out on the basis of the control of theoretical knowledge, practical skills.

Form of current control:

- Theoretical knowledge - the test with a plural choice of the answer and that definitions of correct sequence of actions provide, situational tasks, individual interrogation, interview;
- Practical skills – solving of typical tasks, the individual control practical skill.

The final control is carried out on the basis of the control of theoretical knowledge, practical skills.

Forms final control:

- Theoretical knowledge - system of questions, test with a plural choice of the answer, solving of situational tasks;
- Practical skills - the individual control of practical skill.

Rating system of points which are given to the students

Results of educational activity progress of each student from Medical biology it is estimated on a rating scale.

Estimation from disciplines it is exposed as average from estimations for modules. The estimation for the module is defined in view of estimations of the current control and a final estimation, which is exposed on theoretical knowledge and practical skills according to the lists determined by the program of discipline “ Medical biology ”. Maximum quantity of points, studying of each module - 200, including for the current educational activity - 120 points, results on modular final control - 80 points.

Mark	Module 1	Module 2	Module 3
"5"	15	9	7
"4"	10	6	5
"3"	5	3	3
"2"	0	0	0

Weight of each theme within the limits of one module identical.

Maximum quantity of points which the student can collect at studying the module, is calculated by multiplication of amount of points, which answer an estimation "5", amount to those in the module with addition of point for individual independent work also it is equaled to 120 points.

Minimum quantity is calculated by multiplication of amount of points, which answer an estimation "3", amount to those in the module with addition of point for individual independent work.

Amount of point for individual independent work of the student at studying the module it is calculated as a difference between a maximum quantity of point for the current educational activity (120 points) and a maximum quantity of point for the current progress of the student. Points for individual independent work are totaled at its successful protection.

MASTERING OF THE MODULE I

Division of points given to students at studying the module I

No.	The module 1	Amount of points
1.	<i>The Substantial module 1</i>	120
	Theme 1	15
	Theme 2	15
	Theme 3	15

	Theme 4	15
	Theme 5	15
	Theme 6	15
	Theme 7	15
	Theme 8	15
	<i>Together</i>	120
	Theme 9	80
	Total	200

Maximum quantity of points which student can collect at studying the module I, is calculated by multiplication of amount of point(15), which answer an estimation "5" amount to those (8) and makes **120 points**.

Minimum quantity of points which the student can collect at studying the module I is *critierion of the admission to the modular final control - the theme 9*, is calculated by multiplication of amount of point(5), which answer an estimation "3", on amount that in the module (8) and makes **40 points**.

MASTERING OF THE MODULE 2

Division of points given to students at studying the module 2.

№ з.п.	The module 2	Amount
1.	<i>Substantial module 2</i>	36
	Theme 10	9
	Theme 11	9
	Theme 12	9
	Theme 13	9
2.	<i>Substantial module 3</i>	45
	Theme 14	9
	Theme 15	9
	Theme 16	9
	Theme 17	9

	Theme 18	9
3.	Substantial module 4	27
	Theme 19	9
	Theme 20	9
	Theme 21	9
	Together substantial modules	108
	<i>Preparation of the review the scientific literature, solving the situational tasks (individual work)</i>	12
	Theme 22	80
Total		200

Maximum quantity of points which the student for the current progress can collect the module 2 it is calculated by multiplication of amount of point(9), which answer an estimation "5" amount to those (12) and makes **108 point**.

For individual independent work (preparation of the review of the scientific literature, solving of situational tasks at its successful solving to the student are totaled **12 more points**.

Thus, a maximum quantity of points which the student can collect at studying the module 2 makes **120 (108 + 12) point**

Minimum quantity of points which the student can collect at studying the module 2 is *critierion of the admission to the modular final control - the theme 22*, is calculated by multiplication of amount of point(3), which answer an estimation "3", on amount that in the module (12) and makes **36 point**

MASTERING OF THE MODULE 3

Division of points given to students at studying the module 3.

№ з.п.	The module 2	Amount of points
1.	The substantial module	21

	5	
	Theme 23	7
	Theme 24	7
	Theme 25	7
2.	<i>The substantial module</i> 6	49
	Theme 26	7
	Theme 27	7
	Theme 28	7
	Theme 29	7
	Theme 30	7
	Theme 31	7
	Theme 32	7
3.	<i>The substantial module</i> 7	21
	Theme 33	7
	Theme 34	7
	Theme 35	7
4.	<i>The substantial module</i> 8	28
	Theme 36	7
	Theme 37	7
	Theme 38	7
	Theme 39	7
	<i>Together semantic modules</i>	119
	Theme 40	80
	<i>Preparation of the review the scientific literature, etc. individual work</i>	1

Total	200
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Maximum quantity of points which the student for the current progress can collect the module 3 it is calculated by multiplication of amount of point(7), which answer an estimation "5" amount to those (17) and makes **119 point**

For individual independent work (preparation of the review the scientific literature) at its successful solving to the student are totaled **1 more point**.

Thus, a maximum quantity of points which the student can collect at studying the module 3 makes **120 (119 + 1) point**

Minimum quantity of points which the student can collect at studying the module 3 is *critierion of the admission to the modular final control - the theme 40*, is calculated by multiplication of amount of point(3), which answer an estimation "3", on amount that in the module (17) and makes **51 point**.

The modular final control is carried out on end of studying of the module. Up to the final control students, which are supposed to have completely visited class from the disciplines stipulated by the curriculum, and at studying the module have collected amount of points, not less minimal. To the student, which has not done all kinds of works stipulated by the curriculum, for the valid reason are brought corrective amendments to the individual curriculum also is allowed to fulfil academic debts to the certain certain term.

Maximum quantity of point modular final control it is equaled 80, which is considered in case that student has collected not less 50 points.

Estimation from disciplines “Medical biology ” is exposed only for students which have done all modules are reckoned from disciplines.

Amount of points which is charged to students, from disciplines “ Medical biology ” is converted in scale ECTS thus:

Estimation ECTS	Statistics
A	The best of 10 % of students

IN	The following of 25 % of students
C	The following of 30 % of students
D	The following of 25 % of students
E	The last of 10 % of students

The percent of students is defined on voters for students of the first year within the limits of a corresponding speciality.

Amount of points which is charged to students, from disciplines “ Medical biology ” is converted in 4-point scale thus:

Estimation ECTS	Estimation on 4-point scale
A	5
B,C	4
D, E	3
FX, F	2

Estimation from disciplines FX, F ("2") it is exposed to students, which are not passed even one module from disciplines after end of studying.

Estimation FX is exposed to students, which have collected the minimum quantity of points for the current educational activity, but have not done the modular final control.

Repeated redone the final modular control it is carried out: after two weeks, and the third - on an extent of 2 (additional) weeks after the ending of Ist Semester on authorized schedule. Redone of final modular control it is allowed no more than 2 times.

Estimation F is exposed to students, which have not collected the minimum quantity of points for the current educational activity and not admitted to the modular

final control Students which have received estimation F on end of studying of discipline, should pass repeated study according to the individual curriculum.

Literature recommended

Main and Additional Sources:

- Medical Biology: Textbook. – Second edition. – Simferopol: IAD CSMU, 2003. – 592 p., 180 fig., 23 tab.
- Bazhora Y.I., Clamazdina N.N., Nickolaevsky V.V., Chesnokova M.M. Medical Biology (lectures), Textbook for students. - Odessa, 2001.
- Kimball J.W. Cell Biology: Addison –Wesley publishing Company.
- Kapit W., Macey R.I., Meisami E. The physiology coloring book: Harer Collins Publishers, 1987.
- Concise Physiology/ Guyton-Ganong-Chatterjee: King Edward Medical College, Lahore. -1998.
- John B. and K., Lewis R. The Meiotic Mechanism, Oxford Biology Readers, No. 65: Oxford University Press. – Oxford, 1973.