THE SCHEDULE OF TUTORIALS - "**BIOLOGY AND GENETICS**" COURSE
FOR FIRST-YEAR STUDENTS OF PHARMACY

No.	Topic	Date
1.	Structure and function of nucleic acids.	05.11.2025
2.	Gene expression in Pro- and Eukaryota, regulation of gene functions.	12.11.2025
3.	Human karyotype. Chromosome aberration syndromes.	19.11.2025
4.	Single-gene inheritance in humans. Blood groups. Mitochondrial inheritance.	26.11.2025
5.	Variability and mutations. Genetic counseling.	03.12.2025
6.	Protozoology part 1. Protozoa of the urogenital and digestive systems.	07.11.2025
7.	Protozoology part 2. Blood and tissue protozoa.	14.11.2025
8.	Flatworms. Parasites of the digestive and circulatory systems.	21.11.2025
9.	Nematodes. Parasites of the digestive and circulatory systems.	28.11.2025
10.	Medical arachnoentomology.	05.12.2025
11.	Checking the effects of self-education.	12.12.2025

Compulsory literature:

1. Lynn B. Jorde, John C. Carey, Michael J. Bamshad. Medical Genetics. Elsevier Health Sciences, 2016
2. Parasitology for medical students (2nd edition). Buczek A. (editor), Koliber Lublin 2007

Additional literature:

1. McLennan A., Bates A., Turner P., White M. Instant Notes in Molecular Biology, Taylor & Francis Ltd., 2012
2. Bhat S. Sastry A.S. Essentials of Medical Parasitology, JP Medical Publishers, 2018

Tutorial No. 1

Topic: STRUCTURE AND FUNCTION OF NUCLEIC ACIDS.

1. Rules for observing occupational health and safety during tutorials.
2. Sources of scientific information.
3. Chemical composition of nucleic acids.
4. Model of DNA structure according to Watson and Crick.
5. Structure and chemical composition of chromatin.
6. Chromosomes in Prokaryotes and Eukaryotes.
7. DNA replication in Prokaryotes and Eukaryotes.
8. DNA isolation.

"Medical Genetics" Chapter 2

Tutorial No. 2

Topic: GENE EXPRESSION IN PRO- AND EUKARYOTES, REGULATION OF GENE FUNCTIONS.

1. Structure, function, and types of RNA.
2. Genetic code.
3. Transcription mechanisms and post-transcriptional processes in Pro- and Eukaryota cells.
4. Mechanisms and stages of protein biosynthesis.
5. Regulation of gene expression in Prokaryotes.
6. Lactose and tryptophan operon in *E. coli*.
7. Mechanisms of regulation of gene expression in Eukaryota.
8. Agarose gel electrophoresis.

"Medical Genetics" Chapter 2

Tutorial No. 3

Topic: HUMAN KARYOTYPE. CHROMOSOMAL ABERRATIONS SYNDROME.

1. Definition of karyotype and karyogram.
2. Chromosome testing methods.
3. Cytogenetic nomenclature of chromosomes and rules for recording karyotypes.
4. Genomic imprinting and the formation and significance of uniparental disomy.
5. Disease syndromes caused by autosome anomalies.
6. Definition and criteria of gender.
7. Sex chromosomes.
8. Barr body.
9. Staining of oral epithelial cells for the presence of Barr bodies.
10. Lyon Theory.
11. Disease syndromes caused by changes in the number of heterochromosomes.

"Medical genetics" Chapter 5 pp. 73-84; Chapter 6 pp. 97-124

Tutorial No. 4

Topic: SINGLE GENE INHERITANCE IN HUMAN. BLOOD TYPES. MITOCHONDRIAL INHERITANCE.

1. Mendel's laws.
2. Criteria for inheritance of autosomal and X-linked monogenic traits (dominant and recessive).
3. Normal and pathological monogenic traits inherited in an autosomal dominant and recessive manner, as well as markers linked to the X chromosome.
4. Antigens and antibodies of the AB0 system.
5. The Bombay phenomenon.
6. Rh group system. Serological conflict in the Rh system.
7. Other blood group systems.
8. Mitochondrial genome.

"Medical genetics" Chapter 3 pp. 36-37, Chapter 4 pp. 55-74, Chapter 5 pp. 84-95

Tutorial No. 5

Topic: VARIABILITY AND MUTATIONS. GENETIC COUNSELING.

1. Division of genetic variability.
2. Types of mutations.
3. Mutagenic factors.
4. DNA repair mechanisms.
5. Diseases associated with DNA repair disorders.
6. Phenotypic diagnosis and initial diagnosis.
7. Construction and analysis of a pedigree.

"Medical genetics" Chapter 3 pp. 25-36, Chapter 4 pp. 58-71, Chapter 6 pp. 102-124, Chapter 13 pp. 249-265, Chapter 15 pp. 283-294

Tutorial No. 6

Topic: PROTOZOOLOGY PART 1. PROTOZOS OF THE URINARY AND DIGESTIVE SYSTEMS.

1. Basics of medical protozoology.
2. Trichomonas vaginalis infection (*trichomoniasis*):
   a) biology of *Trichomonas vaginalis,*
   b) occurrence,
   c) etiology,
   d) course of the disease and symptoms,
   e) diagnosis and treatment.
3. Biology of intestinal protozoa:
   - *Entamoeba histolytica*,
   - *Entamoeba coli*,
   - *Giardia lamblia (Lamblia intestinalis)*
   - *Balantidium coli,*
4. Amoebiasis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course:
      - intestinal amoebiasis
      - intestinal-hepatic amoebiasis
   e) diagnosis and treatment.
5. Giardiasis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course,
   e) diagnosis and treatment.
6. Infections with other intestinal protozoa (balantidiosis).
7. Prevention of intestinal protozoan infections.

Tutorial No. 7

Topic: PROTOZOOLOGY PART 2. BLOOD AND TISSUE PROTOZOA

1. Pathogenesis of invasive diseases.
2. Basic principles of treatment of invasive diseases.
3. Biology of some blood and tissue protozoa:
   - *Trypanosoma gambiense*,
   - *Plasmodium vivax*,
   - *Plasmodium falciparum*.
   - *Toxoplasma gondii*,
   - *Naegleria fowleri*,
   - *Leishmania donovani,*
   - *Trypanosoma cruzi*.
4. African sleeping sickness (African trypanosomiasis).
5. Malaria:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course,
   e) diagnosis,
   f) treatment.
7. Toxoplasmosis:
   a) etiology,
   b) epidemiology, infection, and prevention,
   c) pathogenesis
   - pathogenesis of congenital toxoplasmosis
   d) clinical course
   - acute toxoplasmosis,
   - chronic toxoplasmosis,
   - congenital toxoplasmosis.
   e) diagnosis and treatment.
8. Primary amoebic encephalitis and meningitis.
9. Visceral leishmaniasis (*kala-azar*).
10. Chagas disease (American trypanosomiasis)

Tutorial No. 8

Topic: FLATWORMS. PARASITES OF THE DIGESTIVE AND BLOOD SYSTEM.

1. Basics of medical helminthology.
2. Biology of selected flatworms:
   - *Fasciola hepatica,*
   - *Clonorchis sinensis,*
   - *Paragonimus westermani,*
   - *Schistosoma haematobium, S. mansoni, S. japonicum,*
   - *Diphyllobothrium latum,*
   - *Taenia saginata (Taeniarhynchus saginatus),*
   - *Taenia solium,*
   - *Echinococcus granulosus.*
3. Liver fluke invasions.
4. Paragonimiasis.
5. Schistosomiasis.
6. Taeniasis *T. saginata* and *T. solium*:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course,
   e) diagnosis and treatment.
7. Cysticercosis:
   a) pathogenesis,
   b) clinical course
   c) diagnosis and treatment.
8. Echinococcosis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course
   e) diagnosis and treatment.

Tutorial No. 9

Topic: NEMATODES. PARASITES OF THE DIGESTIVE AND BLOOD SYSTEM.

1. Biology of selected roundworms:
   - *Enterobius vermicularis*,
   - *Ascaris lumbricoides*,
   - *Trichuris trichiura*,
   - *Toxocara sp*.,
   - *Trichinella spiralis*,
   - *Wuchereria bancrofti*,
   - *Onchocerca volvulus,*
   - *Loa loa.*
2. Enterobiosis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course,
   e) diagnosis and treatment.
3. Ascariasis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis and clinical course,
   d) diagnosis and treatment.
4. Trichuriasis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis and clinical course,
   d) diagnosis and treatment.
5. Visceral larva migrans syndrome:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis and clinical course,
   d) diagnosis and treatment.
6. Trichinellosis:
   a) etiology,
   b) epidemiology and prevention,
   c) pathogenesis,
   d) clinical course
   e) complications,

f) diagnosis and treatment.

7. Filariasis.

Tutorial No. 10

Topic: MEDICAL ARACHNOENTOMOLOGY.

1. Principles of epidemiology and prevention of invasive diseases.
2. Basics of medical arachnoentomology.
3. Biology of selected parasitic arthropods:
   - *Sarcoptes scabiei,*
   - *Ixodes ricinus,*
   - *Pediculus humanus,*
   - *Pthirus pubis,*
   - *Cimex lectularius,*
   - *Anopheles maculipennis,*
   - *Culex pipiens,*
   - *Musca domestica,*
   - *Glossina palpalis,*
   - *Pulex irritans*
   - *Tunga penetrans*
   - *Triatoma infestans*
4. Scabies:
   a) etiology
   b) epidemiology and prevention,
   c) clinical course,
   d) diagnosis and treatment.
5. Pediculosis.
6. The role of arthropods as disease vectors.
7. The role of arthropods as direct factors causing diseases and ailments.

Tutorial No. 11

Checking the effects of self-education.