

SYLLABUS

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| Subject: | Biology 1 | | |
| Study Programme: | <i>General Medicine</i> | Study Period: | <i>1. semester</i> |
| Evaluation: | <i>passing</i> | Subject Type: | <i>mandatory(compulsory)</i> |
| Content: | <i>2 lecture and 2 exercise hours /week</i> | | <i>Total 56 hours</i> |

Department: Department of Medical Biology

| <i>Week</i> | <i>Lectures</i> | <i>Practical Lessons</i> |
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| 1. | Introduction to the study of medical biology. Basic properties, structure and functions of living organisms, molecular and cellular nature of life. Cell structure I - The simplest forms of life - viruses and prokaryotic cells | Microscopy I. – introduction, light microscope, construction of microscope, optical pathway in a compound microscope, adjustment and use of microscope |
| 2. | Cell structure II – eukaryotic cell, cell organelles – their structure and functions | Microscopy II. – microscopic examination of simple objects (printed letters, air bubbles, fingerprint, the use of oil immersion objective) |
| 3. | Cell structure III – eukaryotic cell, cell organelles – their structure and functions | Preparing samples for light microscopy – wet mount, microscopic examination of Protozoa - vital staining, blood smear and print preparation |
| 4. | General characteristic of biomembranes – molecular structure of biomembranes, transport of molecules through the membrane | Biomacromolecules – structure and function of biomacromolecules, purification of nucleic acids, solving tasks and problems. |
| 5. | The structural organization of genome – organization of DNA in genomes, the basic principles of human cytogenetics | Cell structure I. – structure and function of prokaryotic and eukaryotic cell, cell organelles – examination of chloroplasts, cell inclusions, vacuoles, mitochondria |
| 6. | Cell cycle I. – cell cycle, replication and repair of DNA | Cell structure II. – examination of nuclei and nucleoli; evaluation of blood smear |
| 7. | Cell cycle II. – cell cycle, control of cell cycle, mitosis | Cell physiology – transport across membranes, osmosis, plasmolysis and deplasmolysis |

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| 8. | Basics of cell signaling TEST 1 | The structural organization of genome – organization of DNA in genomes, making a human karyotype, FISH method |
| 9. | Cell cycle III. – meiosis, spermatogenesis, oogenesis, fertilization in human | Cell cycle I. – cell cycle stages, replication, solving tasks and problems |
| 10. | Cell differentiation, cell ageing and cell death | Cell cycle II. – mitosis, examination of mitotic stages on squashed preparations, examination of human metaphase chromosomes |
| 11. | Gene expression I. – gene structure and function, transcription, post-transcriptional RNA processing | Cell cycle III. – meiosis, genetic consequence of meiosis, gametogenesis, microscopic examination of meiotic stages on fixed mounts |
| 12. | Gene expression II. – translation, synthesis of proteins, posttranslational modifications, regulation of gene expression | Microscopic analysis of cells and tissues I. – cell measurement, counting, and analysis |
| 13. | The basic principles of epigenetics TEST 2 | Microscopic analysis of cells and tissues II. – cell measurement, counting, and analysis |
| 14. | Genomics and medicine | Physical and chemical properties of living substances/dermatoglyphics |