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| **Subject** | **CELL BIOLOGY AND GENETICS** | | | |
| **Type** | **Semester** | **ECTS** | **Code** |
| OBLIGATORY (O) | 1 | 6 | 130CBG104 |
| **Course Lecturer** | **Prof. Asst. Dr. Hyzer Rizani** | | | |
| **Course Assistant** |  | | | |
| **Course Tutor** |  | | | |
| **Aims and Objectives** | The objective of the course "Cell Biology and Genetics" is to acquaint students with basic knowledge about the organism of the living world in general, and about the human organism in particular, from the molecular level, continuing with the cellular structure, the construction and functions of organelles, reactions cellular metabolism.  The main purpose of the course is:   * The student will gain knowledge about cellular structure, construction and functions of organelles, cellular metabolic reactions. * Cellular energy generation, protein biosynthesis, cell division, DNA structure and functions. * Familiarity with Human genes, the construction and biological functions of organs and basic knowledge about the environment. * Molecular methods that find application in Biotechnology such as PCR, Clusters of interspersed short regular palindromic repeats (CRISPR)-Cas9 * Familiarity with Mechanisms of inheritance, causes of genetic changes (mutations), rules of inheritance, diseases as a result of changes in the number and structure of chromosomes | | | |
| **Learning Outcomes** | Upon completion of this course, students should be able to:   * Gain knowledge of the technique of using the microscope. Describe and clarify the cell, its structure and functions as the basic unit of organisms. * To understand the organization of processes in the cytoplasm and the cell nucleus. They learn the construction of the cell membrane, its functions. Transport of ions and molecules across the cell membrane, * Describe and explain the transfer of information from the DNA molecule, through the RNA molecule to the protein. They understand the basics of the laws of inheritance of human qualities with different examples. * Learn the appearance of changes in the structure of genetic material and their connection to phenotypic changes. * To understand biochemical and biophysical processes in cells. They gain knowledge from the subject of Biology with Genetics, which will serve as a lesson for molecular methods applied in biotechnology. | | | |
| **Course Content** | **Course Plan** | | | **Week** |
| Presentation of the subject, branches of Biology: Molecular biology of one and many cells | | | 1 |
| Cell, discovery of the cell, cell theory, prokaryotes, eukaryotes, structure and function of the cell membrane | | | 2 |
| Membrane contacts, forms of cell permeability, diffusion, osmosis, filtration, facilitated diffusion, active transport, the role of ion pumps in medicine, endocytosis  ​ | | | 3 |
| Cell organelles with one and two membranes: nucleus, endoplasmic reticulum, Golgi apparatus, mitochondria, chloroplasts, lysosomes, peroxisomes. Organelles without membranes, cytoskeleton, target,  flagellum, | | | 4 |
| Internal membranous system - Cell organelles, Metabolic-regulatory processes in the cell | | | 5 |
| Cell nucleus – Structure and synthesis of nucleic acids | | | 6 |
| Chromosomes – construction and division of chromosomes | | | 7 |
| Cell division – mitosis and meiosis | | | 8 |
| Principles of inheritance – Mendel's laws | | | 9 |
| Chromosomal aberrations–sex-linked genes | | | 10 |
| Bacterial Genetics, Recombinant ADNTechnology | | | 11 |
| Types of inheritance, cloning and PCR | | | 12 |
| Gene therapy, regenerative medicine and the future of human genetic medicine | | | 13 |
| Genetic mapping, genomics | | | 14 |
| Final examination | | | 15 |
| **Literature/References** | 1. Naser Kamberi, Hyzer Rizani (2019): Biologjia qelizore molekulare me gjenetike, Shtëpia botuese “Lena graphics desingn” UBT-Prishtine 2. Naser Kamberi, Hyzer Rizani (2020): Gjenetike humane me biologji qelizore dhe molekulare, Shtëpia botuese “Lena graphics desingn” UBT-Prishtine 3. Rexha, T. (1998): Biologjia qelizore dhe molekulare, Shtëpia botuese “Libri Universitar” Tirane. 4. Shumka S. Fejzaj A. (2013): Biologjia e Pergjithme , Shtepia Botuese &Shtypshkronja “Pegi”, Tirane. 5. Berns M.W. Stanice (1991) (perkthimi I K. Milković) Školska knjiga, Zagreb. 6. Alberts, B. et al. : Molecular Biology of Cell , fifth edition, Garland Science, 2008; New York & London 7. Elsa, K., Çaço, B., Çeka, Xh.(2002): Bazat e histologjisë dhe embriologjisë, Shtëpia Botuese e Librit Universitar, Tiranë.   Campbell, Neil. A. (2002): Biology. 6th ed. The Benjamin/Cummings Publishing Company, San Francisco, CA, USA | | | |
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