

Course title: MOLECULAR BIOLOGY AND GENETICS

ECTS credit allocation (and other scores): ECTS: 4

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Medical and health sciences

Language: English

Number of hours per semester: 50

Course coordinator/ Department and e-mail: dr n. med. Michael Thoene / Medical Biology /
Michael.thoene@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Prokaryotic and eukaryotic cells, cell cycle, chromosomal theory and rules of monogenic inheritance, multifactorial traits, interaction of genes, genetic blood groups in humans, types of sex determination, inheritance of sex-linked traits. The structure of chromosomes and description of karyotypes, mutagenesis, basics of population genetics. Environmental threats from chemical and biological agents. Analysis of risks of transgenic organisms to humans and the environment. Genetic engineering techniques and molecular diagnostics. Methods for isolating nucleic acids. Principles of PCR. Enzymes used in molecular biology. Gene Therapy. The human genome project. The biological properties of stem cells.

LECTURES: The structure and function of lipids and carbohydrates. Characterization of primary, secondary, tertiary, and quaternary protein structure. Protein modifications and their functions, as well as the regulation of protein degradation. The structure of RNA, DNA and chromatin. DNA replication, repair and recombination, as well as the regulation of nucleic acid degradation. Transcription, translation, and the regulation of gene expression. The human genome, transcriptome, and proteome, including their function and methods of analysis.

Learning purpose: To make the student aware of the characteristics and genetic determinants of human disease, the human genome, the use of molecular biology methods in medicine and the use of stem cells in regenerative medicine.

On completion of the study programme the graduate will gain: an awareness of his own limitations and the need for lifelong learning in the field of molecular biology and genetics; particularly taking into account the characteristics and genetic determinants of human disease, the human genome, the use of molecular biology methods in medicine and the use of stem cells in regenerative medicine

Knowledge: The student will know the basic concepts, laws and mechanisms in the fields of genetics & molecular biology

Skills: Student will be able to recognize human traits, diseases and their mechanisms

Social Competencies: The student will be aware of his own limitations and the need for lifelong learning in the field of molecular biology and genetics



Basic literature:

1. A. Buczek "Medical Biology, Part 1", Koliber, Lublin 2007
2. A. Buczek "Medical Biology, Part 2", Koliber, Lublin 2007

Supplementary literature:

3. Jorde, Lynn B., et.al. "Medical Genetics" 4th edition. Elsevier MOSBY. Philadelphia: 2010
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The allocated number of ECTS points consists of: 106 hours

Contact hours with an academic teacher: 51 hours

Student's independent work: 55 hours