UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Faculty of Biology and Biotechnology

Course title: MOLECULAR BIOLOGY

ECTS credit allocation (and other scores): 2

Semester: autumn

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 30 h.

Course coordinator/ Department and e-mail: Nina Smolińska; Department of Animal Anatomy and Physiology; nina.smolinska@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Principles of occupational health and safety in the molecular biology laboratory. Analysis of the structure of selected genes and their polymorphisms. The action of restriction enzymes. Restriction analysis of the pUC19 vector (PCR-RFLP). Fluorescent immunohistochemistry and immunocytochemistry - preparation and fixation of tissue/cell preparations, blocking, incubation with primary and secondary antibodies, immunodetection, staining of animal tissue sections, analysis of preparations using a fluorescence microscope and computer programs (e.g. analySIS5, cellF; Olympus). Seminar - "The latest achievements in molecular biology".

LECTURES: Structure and functions of cell macromolecules. Properties of nucleic acids and proteins. The concept of a gene and genome. The human genome program. Interactions of nucleic acids with proteins and protein interactions. Structure of a prokaryotic and eukaryotic gene. The central dogma of molecular biology. DNA replication. Building promoters. RNA transcription and processing. Mechanism of intron excision, alternative splicing, RNA editing. Translation and post-translational events. Regulation of gene expression. Genetic code. Damage, repair and recombination of DNA. Genetic changes and changes in the regulation of the cell cycle leading to the formation of cancer. Achievements of molecular biology.

LEARNING PURPOSE: Getting to know the basic information about the molecular biology of the prokaryotic and eukaryotic cells. Understanding the principles of the flow of genetic information in the cell from replication through transcription to translation and post-translational processing.

On completion of the study programme the graduate will gain:

KNOWLEDGE: the student knows and understands the molecular basis of the functioning of prokaryotic and eukaryotic organisms, describes the molecular organization of the cell, basic techniques and research tools used in biology, basic principles of ergonomics, hygiene and safety of work with biological material

SKILLS: the student can use molecular biology methods, perform simple work with the use of biological material, use the basic equipment and apparatus used in the field of molecular biology, collect process and provide written and oral scientific information.

SOCIAL COMPETENCIES: the student is ready to work in a team, constantly updating knowledge in the field of biology, responsible for the assessment of risks arising from the use of biological tools and risks in the workplace, and complies with health and safety regulations.

Basic literature: 1. Clark, David P., Molecular biology, Wyd. London: Academic Press is an imprint of Elsevier, R. 2019

2. Howell, Stephen H. editor, Molecular Biology, New York, NY: Springer New York : Imprint: Springer, R. 2014 3. Burton E. Tropp, Molecular biology: Genes to proteins., Jones Bartlett Publishers, R. 2011 4. http://www.protocol-online.org/prot/Molecular_Biology
Supplementary literature: 1. Green M.R. , Sambrook J., Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory Press, R. 2001

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 34 h.

Student's independent work: 16 h.