UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Faculty of Biology and Biotechnology

Course title: MOLECULAR BIOLOGY LABORATORY II

ECTS credit allocation (and other scores): 4

Semester: autumn

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

Branch of science: Natural sciences

Language: English

Number of hours per semester: 50 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. Preparation and morphological evaluation of tissue preparations for in situ hybridization (ISH). Staining of sections of animal tissues. Determination of the cellular localization of the transcript by ISH and densitometric analysis of its quantity. Isolation of proteins from animal tissues, their electrophoretic separation and immunodetection using the Western Blot. Densitometric analysis of protein concentration using the Image Studio lite (Li-cor) computer program. Determination of the localization of proteins using Immunohistochemistry (IHC) and immunocytochemistry (ICC). Determination of the concentration of the selected antigen by enzyme immunoassay - ELISA

LECTURES: Nucleic acid hybridization. Types of hybridization probes and methods of their labelling. Characterization of hybridization methods (dot-blot, Southern, Northern, Western Blot). Characteristics of antibodies used in immunodetection. Labelling methods and antibody detection. Immunohistochemistry and immunocytochemistry. Immunoenzymatic method - ELISA test. Stereotaxia and administration of substances to the CNS - the importance of intraventricular injections in diagnosis and treatment.

LEARNING PURPOSE: Knowledge of research methods in the field of molecular biology used in genomic and proteomic research. The ability to select and apply the known methods of molecular biology and the ability to properly interpret the obtained results. Ability to use online databases and professional literature for description and reporting on issues in the field of molecular biology.

On completion of the study programme the graduate will gain:

KNOWLEDGE: the student knows and understands the possibilities of using biological material, techniques and research tools used in biological laboratories, basic principles of ergonomics, hygiene and safety of work with biological material.

SKILLS: the student can use): use molecular biology methods, perform simple work with the use of biological material, use available sources of scientific information, collect, process, and provide written and oral scientific information.

SOCIAL COMPETENCIES: the student is ready to work in a team, assuming a variety of roles, constantly updating knowledge in the field of biology, assessing the risks arising from the use of biological tools and threats in the workplace, and complying with health and safety regulations, ethical conduct in working with biological material.

Basic literature: 1. Any authors, Selected scientific publications on the subject 2014-2024, 2. Burton E. Tropp, Molecular biology: Genes to proteins., Jones Bartlett Publishers, R. 2011 2. http://www.protocol-online.org/prot/Molecular_Biology 3. https://molecular-biology.coe.hawaii.edu/protocols/

Supplementary literature: 1. Sambrook J. Russel D., Molecular clonning, Cold Spring Harbor Laboratory Press, R. 2001

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 52 h.

Student's independent work: 48 h.