

Module code	M_WE_SEM3 PW 1B/2B TECH BIOL MOL
Field of study	Veterinary medicine
Module name, also the name in English	Utility of molecular biology techniques in veterinary studies and veterinary diagnostics Wykorzystanie technik biologii molekularnej w badaniach i diagnostyce weterynaryjnej
Language of instruction	English
Module type	elective
Level of studies	Long-cycle Master's degree programme
Mode of study	full-time
Year of study in the field of study	II
Semester of study in the field of study	III
ECTS credits, divided into contact/non-contact hours	1 (0.6/0.4)
Academic title/degree, name of the person responsible for the module	prof. dr hab. Łukasz Adaszek
Unit teaching the module	Department of Epizootiology and Clinic of Infectious Diseases
Module objective	Knowledge of structure and mechanisms of DNA replication, gene expression, basic molecular diagnostic techniques, including methods of isolation and amplification of nucleic acids (PCR, LAMP PCR, Real-time PCR), detection of gene polymorphisms, computer analysis of nucleotide and amino acid sequences of proteins and genes; knowledge of cloning methods, in situ hybridization. Learning the principles of cell culture for virological diagnosis. Learning to perform PCR tests and electrophoresis independently
The learning outcomes for the module include a description of the knowledge, skills and social competences that the student will gain after completing the module.	Knowledge:
	K1. Knows the basic molecular biology techniques used in animal disease diagnosis (sequencing, PCR, electrophoresis, et.al)
	K2. Has the knowledge necessary to analyze the obtained results of molecular tests (sequencing, PCR, electrophoresis, etc.)
	K3. Has knowledge of the principles of cell culture assays
	Skills:
	S1. Is able to collect appropriate sample for molecular testing and knows methods for handling the sample (swabs, blood, feces, semen, tissue, saliva, etc.).
	S2. Is able to use specialized equipment necessary for molecular studies (thermocyclers, electrophoresis equipment, gel archiving equipment, sequencers, water baths, DNA isolation blocks)
	S.3. Is able to perform nucleic acid amplification reaction, RFLP analysis
	S.4. Is able to perform computer analysis of nucleotide and amino acid sequences
	Social competences:
	C1. Is prepared to prioritize the tasks necessary to work in an analytical laboratory (order and sequence of tests, sequence of sample handling)

	C2. Is aware of its own limitations and is able to use the advice and assistance of specialized units or experienced laboratory workers (help in analyzing the results of sequencing, PCR, electrophoresis, restriction analysis RFLP)		
Prerequisites and additional requirements	-		
Module programme content	<p>Issues concerning:</p> <ul style="list-style-type: none"> <li>- methods of collecting samples for molecular studies, its protection; methods of DNA and RNA isolation from various types of biological material for the diagnosis of viral, bacterial, fungal and parasitic diseases</li> <li>- amplification methods of PCR, nested PCR and real-time LAMP PCR,</li> <li>- applications of cloning and sequencing techniques in practice.</li> <li>- determination of gene polymorphisms using RFLP techniques,</li> <li>- DNA sequencing analysis and computer processing of nucleotide and amino acid sequences</li> <li>- hybridization,</li> <li>- microarrays</li> <li>- mass spectrometry,</li> <li>- conducting cell cultures for virological diagnostics and biotechnology</li> </ul>		
List of core and supplementary literature	1. Wen-Hisung Li: Molecular evolution, Sinauer Associates Inc, Publishers. 1997		
Planned forms/activities/teaching methods	Teaching methods: laboratory exercises, multimedia presentations, discussion.		
Verification methods and ways of documenting the achieved learning outcomes.	<p>In order to get a credit for the course it is necessary to attend classes (one absence is allowed) and take a written test at the end of the semester (consisting of single-choice questions). Grading scale is determined in accordance with Book of Education Quality</p> <p>Skill outcomes are assessed by the teacher who observes and evaluates practical tasks and hands-on skills during laboratory activities. Grading scale according to Book of Education Quality</p> <p>The competencies gained are assessed through discussion. In addition, the approach to self-study and the ability to interact are evaluated</p>		
ECTS credits	<b>CONTACT</b>		
		<i>Hours</i>	<i>ECTS</i>
	tutorials	4	0.16
	laboratory classes	10	0.4
	credit	1	0.04
	<b>TOTAL</b>	<b>15</b>	<b>0.6</b>
	<b>NON-CONTACT HOURS</b>		
	preparation for classes	5	0.2
	exam preparation	5	0.2
	<b>TOTAL non-contact hours/ ECTS credits</b>	<b>10</b>	<b>0.4</b>

The workload of activities that require direct participation of an academic teacher	tutorials	4	0.16
	laboratory classes	10	0.4
	credit	1	0.04
	<b>TOTAL</b>	<b>15</b>	<b>0.6</b>
Relation of module learning outcomes to major learning outcomes	K1 --- A.W8 ++, A.W10 ++, A.W14 ++ K2 --- A.W14 +++ K3 --- A.W14 ++ S1 --- B.U6 ++ S2 --- A.U2 ++, B.U7 ++ S3 --- A.U2 ++, B. U7 ++ S4 --- B.U7 ++, B.U20 ++ C1 --- K1 ++, K2 ++, K7 ++ C2 --- K7 ++, K8 ++, K9 ++, K11 ++		
Elements and values affecting final grade	final grade test credit - 90% grade in practical classes - 10%		