

Code of subject	M_WE_SEM4 MIKRO 1
Field of study	Veterinary medicine
Name of the training module including the Polish name	Microbiology 1 Mikrobiologia 1
Language of instruction	English
Type of the training module	obligatory
Level of the training module	Master level
Form of studies	Full-time
Location in the programme (year)	II
Location in the programme (semester)	IV
Number of ECTS credits with a division into contact/noncontact	6 (3,5/2,5)
Name and surname of the person in charge	Aneta Nowakiewicz assoc. professor
Unit offering the subject	Sub-Department of Veterinary Microbiology
Aim of the module	The aim of module is to acquire the knowledge of morphology, physiology, biological properties, features of pathogenicity and resistance of microorganisms that cause diseases in animals and pose a threat to public health (bacteria, fungi, viruses) in the aspect of their identification and control Students acquire practical skills in carrying out individual stages of laboratory microbiological diagnostics, interpreting the obtained results, and handling infectious material
Learning outcomes	<p>Knowledge:</p> <p>K1. Student knows the general mechanisms underlying the formation of infectious diseases in animals: bacterial, viral and fungal.</p> <p>K2. Student has general knowledge of microbial morphology and physiology and the possibility of using basic diagnostic techniques in bacteriology, virology and mycology</p> <p>K3. Student knows the biology and elements of diagnostics of infectious agents (viruses) causing animal diseases, including zoonoses, and the mechanisms of transmission of these diseases.</p> <p>Skills:</p> <p>S1. Student is able to use the basic methods and techniques used in microbiological diagnostics</p> <p>S2. Student is able to care infectious materials, select and utilize appropriate methods of decontaminating</p> <p>S3. Student is able to search, analyze and use the necessary information in the field of microbiology from various sources and in various forms</p> <p>Social competences:</p> <p>Sc1. Student is ready to take responsibility for decisions made in relation to people and animals</p> <p>Sc2. Student is ready to constantly expand the knowledge and improve his/her own skills</p>

Preliminary and additional requirements	Graduated modules: Cell biology, Biochemistry
Contents of the training module	<p><b>Lectures:</b></p> <p><i>General microbiology:</i></p> <ul style="list-style-type: none"> <li>- microbial morphology,</li> <li>-physiology of microorganisms: factors conditioning the growth of bacteria and fungi</li> <li>- physical, chemical and mechanical factors limiting the growth of microorganisms</li> <li>- factors and mechanisms determining the genetic variability of bacteria</li> </ul> <p><i>Virology:</i></p> <ul style="list-style-type: none"> <li>- methods used in laboratory virological diagnostics (cell culture, serological and molecular methods)</li> <li>- virus replication processes</li> <li>- bacteriophages: morphology, physiology and significance in therapy</li> <li>- detailed characteristics of selected virus families: <i>Rhabdoviridae, Orthomyxoviridae, Flaviviridae, Reoviridae, Asfarviridae, Coronaviridae</i></li> </ul> <p><b>Lab classes:</b></p> <p><i>Laboratory methods used to identify microorganisms:</i></p> <ul style="list-style-type: none"> <li>- Types of microscopes - microscopy technique,</li> <li>-Types and methods of staining.</li> <li>-Bacteria culture: Bacterial media and methods of culture.</li> <li>-The influence of physical and chemical factors on bacteria.</li> <li>- Methods and devices used for sterilization and disinfection</li> <li>-Antibiotics susceptibility tests (DDM, E-test, MIC and MBC determination methods)</li> <li>-.Methods for determining the number of bacteria</li> <li>-Biochemical test used for identification (classical and commercial).</li> <li>-Basic methods in serological diagnostics,</li> <li>-Molecular methods used in microbiology,</li> <li>-Determining the titer of bacteriophages,</li> <li>-Basic techniques and methods used in the diagnosis of viral diseases (laboratory diagnostics of rabies virus)</li> </ul>
Recommended and obligatory reading list	<p><b>Obligatory reading list</b></p> <ol style="list-style-type: none"> <li>1. Markey B., Leonard F., Archambault M., Cullinane A., Maguire D.: Clinical veterinary Microbiology</li> <li>2. Gyles C.L., Prescott J.F., Songer G, Thoen C. O.: Pathogenesis of bacterial infections in animals</li> <li>3. Murray P.R. Rosenthal KS., Pfaller MA.: Microbiology.</li> <li>4. Content of lectures</li> </ol> <p><b>Recommended reading list:</b></p> <ol style="list-style-type: none"> <li>5. Cowan M.K, Smith H.: Microbiology : A system approach</li> <li>6. Tille P.M.:Diagnostics microbiology</li> </ol>

The intended forms/activities/ teaching methods	Lectures (ppt presentations), demonstration and practical performance of microbiological diagnostic procedures in the field of bacteriology, virology and mycology, discussion																																						
Methods of verification and documentation forms of the achieved learning outcomes	<p><b>Knowledge:</b> According to point 4th of the Instruction "Verification of learning outcomes at the Faculty of Veterinary Medicine No. 1" (in Polish in: Faculty Book of Education Quality) in order to pass the exam, tests and control work, the score <math>\geq 61\%</math> must be obtained. Result below 60% is insufficient (2.0) and not allow obtaining a positive grade from part material or exam.</p> <p><b>All credits are in writing form only:</b></p> <p>-<b>control works:</b> short test (15 min at the beginning of second day of lab. classes, every week) including 10 questions (single choice test). A correct answer to at least 6 questions results in a positive assessment.</p> <p>-<b>tests:</b> taken after each thematic block (Student must take two tests during <i>Microbiology 1</i>) To be admitted to the writing the test, you must obtain a positive grade from at least:</p> <ul style="list-style-type: none"> <li>- 3 control works (out of 7 possible from <b>General Microbiology</b>),</li> <li>- 2 control works (out of 5 possible from <b>Veterinary virology</b>),</li> <li>- Laboratory diary evaluation</li> </ul> <p><b>Skills:</b></p> <ul style="list-style-type: none"> <li>- Assessment of self-conducted laboratory procedures and experiments by the teacher during each lab classes,</li> </ul> <p><b>Social competences:</b></p> <ul style="list-style-type: none"> <li>- participation in the discussion, answer to the questions at the beginning of each laboratory class, written tests.</li> <li>- <b>final credit from <i>Microbiology 1</i></b> module: individual blocks includes the answer to 30 questions, including 10 open tasks. To get credit student must get at least 18 points in writing test (at least 61%) from each block (<i>General microbiology</i> and <i>Veterinary virology</i>)</li> </ul>																																						
Balance of ECTS credits	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;"><b>STATIONARY</b></th> </tr> <tr> <th style="width: 60%;"></th> <th style="width: 20%; text-align: center;"><i>Hours</i></th> <th style="width: 20%; text-align: center;"><i>ECTS credits</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">30</td> <td style="text-align: center;">1,2</td> </tr> <tr> <td>Classes</td> <td style="text-align: center;">45</td> <td style="text-align: center;">1,8</td> </tr> <tr> <td>Consultation</td> <td style="text-align: center;">5</td> <td style="text-align: center;">0,2</td> </tr> <tr> <td>Final grade (tests/retake tests)</td> <td style="text-align: center;">8</td> <td style="text-align: center;">0,3</td> </tr> <tr> <td><b>TOTAL</b></td> <td style="text-align: center;"><b>88</b></td> <td style="text-align: center;"><b>3,5</b></td> </tr> <tr> <th colspan="3" style="text-align: center;"><b>NONSTATIONARY</b></th> </tr> <tr> <td>Preparation for lab classes</td> <td style="text-align: center;">20</td> <td style="text-align: center;">0,8</td> </tr> <tr> <td>Studying of literature</td> <td style="text-align: center;">30</td> <td style="text-align: center;">1,2</td> </tr> <tr> <td>Preparation for passing</td> <td style="text-align: center;">10</td> <td style="text-align: center;">0,4</td> </tr> <tr> <td><b>TOTAL</b></td> <td style="text-align: center;"><b>60</b></td> <td style="text-align: center;"><b>2,5</b></td> </tr> </tbody> </table>			<b>STATIONARY</b>				<i>Hours</i>	<i>ECTS credits</i>	Lectures	30	1,2	Classes	45	1,8	Consultation	5	0,2	Final grade (tests/retake tests)	8	0,3	<b>TOTAL</b>	<b>88</b>	<b>3,5</b>	<b>NONSTATIONARY</b>			Preparation for lab classes	20	0,8	Studying of literature	30	1,2	Preparation for passing	10	0,4	<b>TOTAL</b>	<b>60</b>	<b>2,5</b>
<b>STATIONARY</b>																																							
	<i>Hours</i>	<i>ECTS credits</i>																																					
Lectures	30	1,2																																					
Classes	45	1,8																																					
Consultation	5	0,2																																					
Final grade (tests/retake tests)	8	0,3																																					
<b>TOTAL</b>	<b>88</b>	<b>3,5</b>																																					
<b>NONSTATIONARY</b>																																							
Preparation for lab classes	20	0,8																																					
Studying of literature	30	1,2																																					
Preparation for passing	10	0,4																																					
<b>TOTAL</b>	<b>60</b>	<b>2,5</b>																																					
Number of contact hours	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 60%;">Participation in lectures</td> <td style="width: 20%; text-align: center;">30</td> <td style="width: 20%; text-align: center;">1,2</td> </tr> <tr> <td>Participation in classes</td> <td style="text-align: center;">45</td> <td style="text-align: center;">1,8</td> </tr> <tr> <td>Consultation</td> <td style="text-align: center;">5</td> <td style="text-align: center;">0,2</td> </tr> <tr> <td>Final grade (tests/retake tests)</td> <td style="text-align: center;">8</td> <td style="text-align: center;">0,3</td> </tr> <tr> <td><b>TOTAL</b></td> <td style="text-align: center;"><b>88</b></td> <td style="text-align: center;"><b>3,5</b></td> </tr> </tbody> </table>			Participation in lectures	30	1,2	Participation in classes	45	1,8	Consultation	5	0,2	Final grade (tests/retake tests)	8	0,3	<b>TOTAL</b>	<b>88</b>	<b>3,5</b>																					
Participation in lectures	30	1,2																																					
Participation in classes	45	1,8																																					
Consultation	5	0,2																																					
Final grade (tests/retake tests)	8	0,3																																					
<b>TOTAL</b>	<b>88</b>	<b>3,5</b>																																					

<p>Relationship between subject learning outcomes and veterinary studies learning outcomes</p>	<p>K1 –A.W10 ++  K2 – A.W13 ++, A.W15+, A.W18++  K3 – A.W13 ++, A.W15++  S1 – A.U2++, A.U10++, B.U7++  S2- B.U6+, B.U25++  S3 – C.U2++  Sc1 – K1++  Sc2 –K7++, K8+++</p>
<p>Impact of selected compounds to final grade</p>	<p>Four absences are allowed per semester (two for 45 minutes of classes and two for 90 minutes of classes). The condition for passing the semester is a positive grade from both blocks (General Microbiology and Virology). The semester grade is the average of grades from both thematic blocks. This grade may be increased by half a grade if the student obtains all grades from the partial short tests (each week) at a level of at least 4.0.</p>