Code of subject	M_WE_SEM5 MIKRO 2
Field of study	Veterinary Medicine
Name of the training module including the Polish name	Microbiology 2 Mikrobiologia 2
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)	III
Location in the programme (semester)	V
Number of ECTS credits with a division into contact/noncontact	7 (3,83/3,17)
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	Knowledge:
	K1. Student knows the specific mechanisms underlying the formation of infectious diseases: bacterial and fungal, considering threats to public health
	K2. Student knows the biology of bacteria and fungi that cause animal diseases, including zoonoses, and the mechanisms of disease transmission and host defense mechanisms
	Skills:
	S1. Student is able to take material for testing and analyze and interpret the results of these diagnostic tests
	S2. Student is able to select and apply targeted microbiological diagnostic procedures in bacteriology and mycology
	S3. Student is able to describe the etiological factors and mechanisms of the development of bacterial, viral and fungal diseases in animals and use the knowledge on this subject to undertake appropriate diagnostic activities
	Social competences:
	Sc1. Student is ready to cooperate and work in a group, has a sense of responsibility for other team members
	Sc2. Student is aware of the importance of social and professional responsibility for animal health and the protection of public health in emergency situations
	Sc3. Student is ready to constantly expand the knowledge and improve his/her own skills

Preliminary and additional requirements	Graduated module: Microbiology 1
Contents of the training module	**Lectures:** -characteristics of microorganisms in terms of targeted isolation, identification, virulence and biological safety of selected types of microorganisms: - Genus: *Escherichia, Salmonella, Yersinia, Klebsiella, Pseudomonas, Pasteurella, Bacillus, Clostridium, Erysipelothrix, Listeria, Mycobacterium, Mycoplasma, Campylobacter, Streptococcus, Staphylococcus, Enterococcus, Brucella, Borrelia, Coxiella, Borrelia, Ehrlichia* genus: *Trichophyton, Microsporum, Candida, Malassezia, Cryptococcus, Aspergillus, Mucor, Fusarium, Scopulariopsis, Penicillium* **Lab classes:** - practical performance of targeted laboratory procedures used in veterinary microbiological diagnostics of selected species of bacteria and fungi: Differential laboratory diagnosis of Gram-negative bacteria of spherical shape: Family: *Enterobacteriaceae*, Genus*: Escherichia, Klebsiella, Enterobacter, Proteus*, Targeted laboratory diagnosis of *Salmonella*, differential laboratory diagnosis of spherical-shape gram-positive bacteria: Genus: *Staphylococcus, Streococococcus, Enterococcus*, laboratory diagnosis aerobic and anaerobic bacteria, gram-positive cylindrical bacteria producing endospores: Genus: *Bacillus, Clostridium*, differential laboratory diagnosis of Gram-positive rod-shaped bacteria: Genus: *Erysipelothrix, Listeria, Rhodoccus*, Laboratory diagnosis of rod-shaped Gram-negative bacteria: Genus: *Pasteurella, Mannheimia, Pseudomonas*, laboratory diagnostics of acid-fast bacteria: Genus: *Mycobacterium*, bacteria without cell wall: Genus: *Mycoplasma, Ureaplasma* and spirochetes: Genus: *Campylobacter,* Principles of mycological diagnostics: conditions, types of cultures and media used in diagnostics; handling of clinical material, mycological diagnostics of yeast-like fungi: Genus: *Candida, Malassezia, Cryptococcus*; dermatophytes: Genus: *Trichophyton, Microsporum, Nannizia*; mold fungi causing opportunistic mycoses: Genus: *Aspergillus, Penicillium, Mucor, Fusarium, Scopulariopsis* and laboratory diagnosis of fungi causing rare deep and generalized mycoses: Genus: *Coccidioides, Histoplasma, Blastomyces, Sporothrix*

Recommended and obligatory reading list	**Obligatory reading list** 1. Markey B., Leonard F., Archambault M., Cullinanee A., Maguire D.: Clinical veterinary Microbiology 2. Gyles C.L., Prescott J.F., Songer G, Thoen C. O.: Pathogenesis of bacterial infections in animals 3. Murray P.R. Rosenthal KS., Pfaller MA.: Microbiology. 4. Content of lectures **Recommended reading list:** 5. Cowan M.K, Smith H.: Microbiology : A system approach 6. Tille P.M.:Diagnostics microbiology
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

<table>
<tr><td>Methods of verification and documentation forms of the achieved learning outcomes</td><td colspan="3"><u>Knowledge:</u>
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 ≥61% must be obtained. Result below 60% is insufficient (2.0) and not allow obtaining a positive grade from part material or exam.
<u>All credits are in writing form only:</u>
-control works: short test (15 min at the begining 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.
-tests: taken after each thematic block (Student must take two tests during Microbiology 2)
To be admitted to the writing the test, you must obtain a positive grade from at least:
- 4 control works (out of 9 possible from Bacteriology),
- 1 control works (out of 4 possible from Mycology),
- Laboratory diary evaluation
<u>Skills:</u>
- Assessment of self-conducted laboratory procedures and experiments by the teacher during each lab classes,
<u>Social competences:</u>
- participation in the discussion, answer to the questions at the beginning of each laboratory class, written tests.
- final credit from Microbiology 2 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 (Bacteriology and Mycology)
- final exam involving checking the knowledge of all four thematic blocks and includes 60 questions (therein single choice test 45 questions and 15 open tasks): 15 questions in the field of General microbiology, 25 questions in the field of Veterinary bacteriology and 10 questions each in the field of Virology and Mycology). The total score (100%) equals 60 points. To pass the exam, you must obtain at least 36 points (i.e. at least 61%)
54,5-60pts -5,0 very good (A)
51,5-54 pts- 4+ fairly good (B+)
45,5-51pts- 4 good (B)
42,5-45 pts- 3+ satisfactory plus (C+)
36-42 pts- 3 satisfactory (C)
Less than 36 pts – 2 unsatisfactory (F) : repeating of the exam is needed)</td></tr>
<tr><td rowspan="8">Balance of ECTS credits</td><td colspan="3">CONTACT</td></tr>
<tr><td></td><td>Hours</td><td>ECTS credits</td></tr>
<tr><td>Lectures</td><td>30</td><td>1,2</td></tr>
<tr><td>Classes</td><td>45</td><td>1,8</td></tr>
<tr><td>Consultation</td><td>5</td><td>0,2</td></tr>
<tr><td>Semester grade/retake tests</td><td>8</td><td>0,32</td></tr>
<tr><td>Final exam</td><td>7</td><td>0,31</td></tr>
<tr><td>TOTAL</td><td>95</td><td>3,83</td></tr>
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	NON-CONTACT		
	Preparation for lab classes	15	0,6
	Studying of literature	30	1,2
	Preparation for semester grade	10	0,4
	Preparation for exam	25	0,97
	TOTAL	**80**	**3,17**
The workload related to the classes requiring direct participation of academic teachers:	Participation in lectures	30	1,2
	Participation in classes	45	1,8
	Consultation	5	0,2
	Semester grade/retake tests	8	0,32
	Final exam/retake exam	7	0,31
	TOTAL	***95***	***3,83***
Relationship between subject learning outcomes and veterinary studies learning outcomes	K1.- AW10+++ K2.- AW13+++, AW15+++, AW18+++ S1.- A.U2+++, A.U10+++, B.U6+++ S2 - B.U6+++, B.U23+ S3 – B.U6+++, B.U25++ Sc1 – K9++,K11+ Sc2 – K1+++, K3++ Sc3 – K7++, K8+++		
Impact of selected compounds to final grade	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 (Bacteriology and Mycology). 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. The final grade is a weighted average calculated according to the scheme: 80% exam grade 10% grade from the Microbiology semester 1 10% grade in the Microbiology semester 2		