

Module code	M_WE_SEM4 IMMUN
Field of study	Veterinary medicine
Module name, also the name in English	Immunology
	Immunologia
Language of instruction	English
Module type	obligatory
Level of studies	Long-cycle master's degree studies
Form of study	Full-time
Year of study in the field of study	II
Semester of study in the field of study	IV
ECTS credits, divided into contact/non-contact hours	3 (2/1)
Academic title/degree, name of the person responsible for the module	dr. hab. Marta Dec
Unit teaching the module	Department of Veterinary Prevention and Avian Diseases
Module objective	The aim of the module is to familiarise students with the structure and function of the immune system, types and mechanisms of immune reactions, possibilities to increase immunity (vaccination and immunostimulation), pathomechanisms of diseases with immunological basis and laboratory immunodiagnostic methods.
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. Student understands the structure and functions of different parts of the immune system in the context of the physiology of other body systems
	K2. Student knows and describes the mechanisms of innate and adaptive immunity, knows and describes the methods to induce and assess the immune response. Students understands the mechanisms of regulation of the immune response induced by an infectious agent
	K3. Student knows and describes the basics of artificial induction of immunity in humans and animals
	K4. Student knows the mechanisms and describes the formation of all types of hypersensitivity, knows and describes the causes and effects of non-specific and specific immunodeficiency and knows the background of Immune-mediated diseases in animals
	Skills:
	S1. Student is able to isolate leukocytes from peripheral blood, prepare leukocyte suspensions of defined density, count cells, determine their viability and establish cell cultures.
	S2. Student is able to assess the morphology of immune cells in blood smears
	S3. Student is be able to perform basic diagnostic tests based on antigen-antibody reaction (agglutination, ELISA, rapid immunochromatographic tests)
	Social competences:

	<p>C1. Student is aware of the necessity of continuous deepening of knowledge and improvement</p> <p>C2. Student is aware of his/her knowledge and the benefits of exchanging views and is willing to share his/her competences with colleagues and animal owners</p>
Prerequisites and additional requirements	Requirements according to the sequence of subjects
Module program content	<p>Lecture topics (each lecture is two hours long):</p> <p>Innate immune system – microbial recognition, macrophage and granulocyte functions.</p> <p>Antigens – types, processing and presentation.</p> <p>Antibodies – formation, structure and properties.</p> <p>Lymphocytes – types and functions.</p> <p>Adaptive immune system – lymphocyte activation, lymphocyte circulation, adaptive cellular and humoral immunity, immunological memory.</p> <p>Primary and secondary immunodeficiencies.</p> <p>Autoimmune diseases – mechanisms providing tolerance to own antigens, factors leading to disruption of self-tolerance, examples of diseases.</p> <p>Anti-infective immunity.</p> <p>Exercise topics:</p> <p>Structure and function of lymphoid organs.</p> <p>Cells involved in the immune response - making blood smears, leukocyte staining and microscopic observation.</p> <p>Phagocytosis – chemotaxis, mechanisms of intracellular killing.</p> <p>Complement system – pathways of activation, functions of the activated complement system.</p> <p>Monoclonal antibodies – application in testing and research.</p> <p>Peripheral blood leukocytes – isolation, viability determination, counting cell cultures.</p> <p>Type I hypersensitivity.</p> <p>Type II, III and IV hypersensitivity.</p> <p>ELISA and RIA tests.</p> <p>Agglutination and precipitation.</p> <p>Rapid immunochromatographic tests.</p> <p>Complement fixation test.</p> <p>Vaccination as a mean of modulating immunity; causes of graft rejection.</p> <p>Flow cytometry in immunological research.</p> <p>Factors affecting immune system activity – immunosuppression and immunostimulation.</p>
List of core and supplementary literature	“Veterinary Immunology. An introduction”, Tizard I.R., Saunders 2017
Planned forms/activities/teaching methods	Lectures, laboratory experiments with measurement of results, laboratory practical class report, demonstration, discussion,

Verification methods and ways of documenting the achieved learning outcomes.

K – the final grade enabling the student to take the exam is composed of the grades obtained from the partial credits and the evaluation of the student's effort.

– Two credit assignments in a written form conducted in class. Each credit assignment consists of 15 single-choice test questions (1 point per question) and 3 open-ended short-answer questions (up to 2 points per question). To obtain credit, students must score at least 61% of the maximum number of points available.

S – evaluation of the immunological test conducted in class; evaluation of the report on the practical classes conducted.

C – participation in discussion; answering questions during laboratory and recitation classes.

To pass the Immunology course, students must receive a passing grade in the exam (minimum 61%). The exam consists of 30 single-choice test questions (1 point per question) and 5 open-ended questions requiring a short answer (maximum 2 points per question), with all questions concerning the topics discussed during lectures and practical classes. The maximum score possible (100%) amounts to 40 points. To receive a passing grade, students must score at least 24 points (i.e. a score amounting to at least 61% of the answer expected).

The grade must be entered into the exam protocol and the student's course record. The documentation included in the "Course File" (student evaluation sheet, attendance lists, sets of questions for credit and written examination, students' written partial credit assignments, written final exam) must be complete as well. If remote learning is used, the way of verifying the learning outcomes will be modified accordingly.

ECTS credits	Form of classes	Number of contact hours	ECTS credits
	Lectures	15	0.6
Practical classes	30	1.2	
Consultations	3	0.12	
Examination	2	0.08	
	Number of non-contact hours		
Preparation for lab classes.	8	0.3	
Preparation for colloquia.	8	0.3	
Preparation for the exam.	10	0.4	
Total	74	3	

<p>The workload of activities that requires direct participation of an academic teacher</p>	<p>15 hrs lectures 30 hours practical classes 3 hrs consultations 2 hrs. examination 50 hrs total which is equivalent to 2 ECTS credits Workload associated with practical activities: - participation in recitation section and laboratory classes - 30 hours, - participation in consultations related to the preparation for the practical classes, credit assignments and the exam - 2 hours, - exam attendance - 2 hours A total of 34 hours, which is equivalent to 1 ECTS credits.</p>
<p>Relation of module learning outcomes to course learning outcomes.</p>	<p>K1 – A.W1. ++ K2 – A.W2. +++, A.W12. + K3 – A.W16. ++ K4 – B.W1. ++ S1 – B.U6. +++ S2 – B.U6. +++ S3 – B.U6. +++, B.U7. + C1 – K8) +++ C2 – K8)++, K11)+</p>
<p>Elements and values affecting the final grade</p>	<p>Only students who have attended the classes and received a passing grade (at least 3.0) on two partial written credit assignments may take the final exam. The final grade for the laboratory classes is the mean of the two tests (70% of the grade) and evaluation of the student's effort in class (30% of the grade). The final grade for the Immunology course is the grade from the written exam.</p>