INFORMATION ABOUT THE COURSE

Immunology

1. Basic information

Field of studies field of medical and health sciences, discipline: medical sciences **Unit responsible for the field of studies** Faculty of Medicine Bydgoszcz University of Science and Technology **Level of studies** Uniform master's studies **Profile of studies** General academic **Form of studies** Full-time	**Studies cycle** …….. **Course code** 17-EMS-IMM-SP2 **Language** English **Obligatory** Yes

Prerequisites	Students must have a solid knowledge of biology to understand the basic mechanisms of the immune system at the cellular and molecular level. Knowledge of the structure and function of lymphatic organs and the cells and proteins responsible for the immune response. Verification of prerequisites in the form of entrance tests.
Introductory courses	Cytophysiology
Coordinator	Anna Urbańczyk, PhD

Study period	**Form of assessment** **Form and hours of classes**	**ECTS credits**
Summer semester	Exam Lecture 30h Exercise 15h Seminar 30h	6.0

2. Learning outcomes

Code	**Description of learning outcomes**	**Learning outcomes reference**
Knowledge (student knows and understands):		
K1	The graduate knows and understands the principles of diagnosing infectious, allergic, autoimmune and neoplastic diseases and blood diseases based on the antigen-antibody reaction	C.W16., O.W1., O.W3., O.W5.
K2	The graduate knows the specific and non-specific mechanisms of humoral and cellular immunity.	C.W18.
K3	The graduate knows and understands the major histocompatibility complex	C.W19.
K4	The graduate knows and understands the types of hypersensitivity reactions, types of immunodeficiencies and the basics of immunomodulation	C.W20.

K5	The graduate knows the issues of immunology of cancer and immunological diseases as well as the principles of immunotherapy.	C.W21.
K6	The graduate knows and understands the genetic basis of donor and recipient selection and the basics of transplant immunology	C.W22.
K7	The graduate knows and understands the molecular basis of cancer diseases and issues in the field of cancer immunology.	C.W42.
K8	The graduate knows and understands the practical elements of molecular biology and immunology used in the diagnosis and therapy of oncological diseases.	C.W43.
Abilities (student can do/perform):		
A1	The graduate is able to analyze reactive, defensive and adaptive phenomena as well as regulation disorders caused by an etiological factor.	O.U3., O.U5., O.U8., O.U9
Social skills (the student is ready to):		
S1	The graduate is ready to take action towards the patient based on ethical principles, with awareness of the social conditions and limitations resulting from the disease.	O.K4.
S2	The graduate is ready to notice and recognize their own limitations, make self-assessment of deficits and educational needs	O.K5.
S3	The graduate is ready to use objective sources of information	O.K7.

3. Programme contents

No.	Programme contents	Form of studies	Learning outcomes covered by the programme content
1	Introduction to immunology. Components of the immune system and their functions.	Lecture	K1
2	Innate and acquired response. Humoral and cellular response. Specific and nonspecific cellular response. Humoral immunity.	Lecture	K2
3	Immune tolerance and autoimmune reactions	Lecture	K1, K4
4	Immune hypersensitivity	Lecture	K1, K4
5	Immunology of infection	Lecture	K1

6	Congenital and acquired immune deficiencies	Lecture	K1
7	Nutrition and immunity	Lecture	K1
8	Immunology of metabolic disorders	Lecture	K1
9	Cancer immunology	Lecture	K5, K7, K8
10	Reproductive immunology	Lecture	K1
11	Transplantation immunology	Lecture	K3, K6
12	Allergy diagnostics: prick tests, patch tests	Exercise, Seminar	K1, K2, A1, S1, S2, S3
13	Diagnosis of Borrelia burgdorferi infection by ELISA and Western blot	Exercise, Seminar	K1, A1, S1, S2, S3
14	Nonspecific defense: barriers and complement system; ELISA test for C1-INH, analysis of results and their clinical significance. Specific defense: antigen-antibody reaction in immunohistochemical staining, analysis of results of tests of various antibodies levels and their clinical significance.	Exercise, Seminar	K1, A1, S1, S2, S3
15	Inflammation: Acute inflammation, CRP test, analysis of causes and effects of inflammation on the example of acute pancreatitis	Exercise, Seminar	K1, A1, S1, S2, S3
16	Cross-reaction: ASO study; Chronic inflammation as exemplified by hyperuricemia and gout	Exercise, Seminar	K1, A1, S1, S2, S3
17	Analysis of differences in the course of viral and bacterial pneumonia. Blood morphology and cytometry.	Exercise, Seminar	K1, K2, A1, S1, S2, S3
18	Hypersensitivity and immunodeficiency: Analysis and recognition of different types of hypersensitivity, comparison of IgE and prick test results and environmental influences in allergy; Analysis of the influence of the complement system and vaccinations and tuberculin test on hypersensitivity reactions, analysis of the causes of delayed hypersensitivity, analysis of the effects of autoantibody reactions to hormone receptors.	Exercise, Seminar	K1, K2, K4, A1, S1, S2, S3
19	Analysis of the effects of nutritional deficiencies, virus activity and genetic mutations in the defense system. Analysis of hypergammaglobulinemia in alcoholism.	Exercise, Seminar	K1, A1, S1, S2, S3

20	Immunological tolerance, autoaggression and diseases in the hematopoietic system: studies and analyses of anti-red cell antibody results using gel cards: ABO, RhD group antibodies, Coombs test (e.g. Kell, P, Lewis, MNS).	Exercise, Seminar	K4, K5, A1, S1, S2, S3
21	Analysis of AB0Rh blood groups in relation to donor/recipient; Analysis of the effects of post-transfusion reactions.	Exercise, Seminar	K1, K2, K3, K6, A1, S1, S2, S3
22	Analysis of microcytotoxic test results between donor and recipient of transplant. Determination of recipient HLA based on donor HLA in kidney transplant, bone marrow transplant, second transplant.	Exercise, Seminar	K3, K5, K6, A1, S1, S2, S3
23	Analysis of types of autoantibodies in autoaggression; Analysis of clinical cases of diseases related to the defense system	Exercise, Seminar	K1, K2, K5, A1, S1, S2, S3

4. Methods of verifying and assessing the learning outcomes achieved by the student

Winter semester

<table>
<tr><td>Form of studies</td><td colspan="2"></td></tr>
<tr><td rowspan="6">Lecture</td><td colspan="2">Methods of studies form:</td></tr>
<tr><td colspan="2">Lecture, Discussion</td></tr>
<tr><td>Methods of verification:</td><td>Involvement:</td></tr>
<tr><td>Written exam</td><td>100%</td></tr>
<tr><td colspan="2">Conditions for passing the course:</td></tr>
<tr><td colspan="2">Final exam - written test: single-choice closed questions.

The points obtained are converted into grades according to the scale described in the PBŚ Regulations.

Passing conditions: obtaining a minimum grade of satisfactory (3.0), after obtaining a number of points corresponding to > 60%.</td></tr>
<tr><td rowspan="6">Exercise</td><td colspan="2">Methods of studies form:</td></tr>
<tr><td colspan="2">Laboratory exercise, Group work</td></tr>
<tr><td>Methods of verification:</td><td>Involvement:</td></tr>
<tr><td>Written test</td><td>60%</td></tr>
<tr><td>Colloquium</td><td>30%</td></tr>
<tr><td>Observation</td><td>10%</td></tr>
<tr><td colspan="2">Conditions for passing the course:</td></tr>
<tr><td colspan="2">The condition for passing the exercises is active participation in classes, completing the assigned laboratory exercises, passing the tests and obtaining a positive result in the final test (pass threshold 60%).</td></tr>
<tr><td></td><td colspan="2">Methods of studies form:</td></tr>
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Seminar	Discussion, case study	
	Methods of verification:	**Involvement:**
	Presentation	70%
	Observation	10%
	Discussion	20%
	Conditions for passing the course:	
	The condition for obtaining credit is activity during classes, participation in discussions, preparation of a multimedia presentation on a given topic.	

Learning outcomes	**Methods of verification**					
	Written exam	Written test	Observation	Colloquium	Presentation	Discussion
K1	X	X	X	X	X	X
K2	X	X	X	X	X	X
K3	X	X	X	X	X	X
K4	X	X	X	X	X	X
K5	X	X	X	X	X	X
K6	X	X	X	X	X	X
K7	X	X	X	X	X	X
K8	X	X	x	x	x	x
A1	x	X	x			X
S1			x			X
S2			X			X
S3			X			x

5. Student workload – balance of hours and ECTS credits

Students activity		**Student workload Number of hours**
Classes conducted with the direct participation of an academic teacher or other persons conducting classes	Lecture	30
	Exercise	15
	Seminar	30
Student's own work	Preparing for classes	15
	Studying literature	15

	Preparing for a test	15
	Preparing a presentation	10
	Preparing for an exam	20
Total student workload		150
ECTS		6

One (teaching) hour is 45 minutes.

6. Literature

The list of required and recommended literature will be provided by the lecturer at the first meeting.