

**SYLLABUS**

**concerning the cycle of education 2021-2027**

(date range)

**1.1. BASIC INFORMATION CONCERNING THIS SUBJECT / MODULE**

Subject / Module	Basic immunology
Course code / module *	Im / C
Faculty of (name of the leading direction)	Medical College of Rzeszów University
Department Name	Medical College of Rzeszów University
Field of study	medical direction
Level of education	uniform master's studies
Profile	practical
Form of study	stationary / extramural
Year and semester	year II, semester IV
Type of course	obligatory
Coordinator	Dr hab. Jacek Tabarkiewicz
First and Last Name of the Teacher	Dr hab. Jacek Tabarkiewicz

\* - According to the resolutions of the Faculty of Medicine

**1.2. Forms of classes, number of hours and ECTS**

Lecture	Exercise	Conversation	Laboratory	Seminar	ZP	Practical	Self-learning	Number of points ECTS
15	15	-	-	15	-	-	-	6

**1.3. The form of class activities**

classes are in the traditional form

classes are implemented using methods and techniques of distance learning

**1.4. Examination Forms / module** (exam, **credit with grade** or credit without grade)

**2. REQUIREMENTS**

Knowledge of biology at an advanced level
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**3. OBJECTIVES, OUTCOMES, AND PROGRAM CONTENT USED IN TEACHING METHODS**

**3.1. Objectives of this course/module**

C1	Understanding the role and action of the immune system, factors regulating this system and immune disorders in the pathomechanism of immune-mediated diseases
C2	The ability to use immunoassay methods and the principles of selecting tests to determine the patient's immune status

### 3.2 OUTCOMES FOR THE COURSE / MODULE (TO BE COMPLETED BY THE COORDINATOR)

EK (the effect of education)	The content of the learning effect defined for the subject (module)	Reference to directional effects (KEK)
EK_01	He knows the basics of development and mechanisms of the immune system, including specific and non-specific mechanisms of humoral and cellular immunity	C.W20
EK_02	Describes the main histocompatibility complex	C.W21
EK_03	He knows the types of hypersensitivity reactions, types of deficiencies	C.W22
EK_04	He knows issues in the field of cancer immunology	C.W23
EK_05	He knows the issues of resistance and the basics of immunomodulation; defines the genetic basis of selection of donor and recipient and the basis of transplantation immunology	C.W24
EK_06	He knows the basic directions of therapy development, in particular the possibilities of cell therapy as well as gene and targeted therapy in specific diseases	C.W41
EK_07	He knows the principles of conducting scientific, observational and experimental research as well as in vitro research for the development of medicine	B.W34
EK_08	Uses an antigen-antibody reaction in current modifications and techniques for the diagnosis of infectious, allergic, autoimmune diseases, blood and cancer diseases	C.U8
EK_09	Associated images of tissue and organ damage with clinical symptoms of the disease, history and results of laboratory tests	C.U11
EK_10	It updates the reactive, defensive and adaptive phenomena and regulation disturbances caused by the etiological factor	C.U12
EK_11	He plans and performs a simple scientific study and interprets its results and draws conclusions	B.U14

### 3.3 CONTENT CURRICULUM (filled by the coordinator)

#### A. Lectures

<p>Course contents</p> <ol style="list-style-type: none"> <li>1. Introduction to issues related to immunology, short history of immunology, development of the immune system</li> <li>2. Inflammation. Complement system</li> <li>3. Regulation of immune response, immunological tolerance and immunomodulation</li> <li>4. Interactions of the immune system with other elements of the human body</li> <li>5. Hypersensitivity</li> <li>6. Autoimmunity</li> <li>7. Immunodiagnostics, practical examples</li> </ol>
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| 1. 8. Introduction to immunoprophylaxis and immunotherapy Wprowadzenie do immunoprofilaktyki i immunoterapii |
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## B. Seminars

Course contents of the exercises
1. Cells of the immune system. Non-specific immune response. phagocytosis
2. CD molecules (cluster of differentiation). Cytometric evaluation of phagocytosis and oxygen outbreak
3. Subpopulations and role of T lymphocytes, NK and NKT cells. Cytotoxic response
4. Immunophenotyping of T, NK, NKT cell subpopulations
5. B lymphocytes. Antibodies. Monoclonal antibodies
6. Methods for assessing maturity and function of B lymphocytes
7. Primary immune deficiencies
8. Analysis of the results of tests of patients with primary immune deficiencies
9. Secondary immune deficiency
1. 10. Application of immunology in modern medicine: scientific research, diagnostics, therapy
Course contents of the seminar
1. Introduction to issues in immunology. Anatomical structure of the immune system. Basic components and characteristics of the immune response. Specific issues: central and peripheral lymphatic organs (structure and function), basic components and essential features of the immune response, receptors recognizing patterns, specific and nonspecific mechanisms of the immune response, types of immune response (cellular and humoral response), immune response stages, phagocytosis and mechanisms cytotoxicity of phagocytic cells, adhesion molecules, diapedesis and leukocyte circulation.
2. A specific immune response. MHC system. An immunological synapse. Cell answer. Specific issues: MHC system, the concept of antigen, antigen presenting cells, maturation of T, NK and NKT lymphocytes, positive and negative selection, MHC restriction, antigen presentation of T lymphocytes, activation of T lymphocytes, antigen-binding T cells. TCR, lymphocyte cytotoxicity mechanisms, immunological memory.
3. A specific humoral immune response. Specific issues: humoral type response, B-cell maturation, positive and negative selection, B-cell activation, B-cell immunoglobulin receptors, immunoglobulins: structure, class, function, immunoglobulin class switching phenomenon, regulation of antibody production and memory B-lymphocytes, interactions between humoral response and cellular.
4. Cytokines and their receptors. Specific issues: basic features and properties of cytokines, cytokine receptors and signaling pathways, interleukin, hematopoietic factors and other growth factors, interferons, superfamily of TNF molecules, hemokines, use of cytokines and their receptors in medicine
5. Resistance in mucous membranes and skin. Anti-infective

immunity.

Specific issues: lymphatic system of mucous membranes of the alimentary, respiratory and reproductive tract, food tolerance, cells of the skin's immune system, characteristics and differences in the immune response against bacteria, viruses, parasites and fungi, protective vaccination.

### 3.4 TEACHING METHODS

lecture: lecture with multimedia presentation

exercises, seminars: working in groups, solving tasks, discussion

## 4 METHODS AND EVALUATION CRITERIA

### 4.1 Methods of verification of learning outcomes

Symbol of effect	Methods of assessment of learning outcomes (Eg.: tests, oral exams, written exams, project reports, observations during classes)	Form of classes
EK_01	colloquium, exam	Exercise, Seminars, Lectures
EK_02	colloquium, exam	Exercise, Seminars, Lectures
EK_03	colloquium, exam	Exercise, Seminars, Lectures
EK_04	colloquium, exam	Exercise, Seminars, Lectures
EK_05	colloquium, exam	Exercise, Seminars, Lectures
EK_06	colloquium, exam	Exercise, Seminars, Lectures
EK_07	colloquium, exam	Exercise, Seminars, Lectures
EK_08	colloquium, exam	Exercise, Seminars, Lectures
EK_09	colloquium, exam	Exercise, Seminars, Lectures
EK_10	colloquium, exam	Exercise, Seminars, Lectures
EK_11	colloquium, exam	Exercise, Seminars, Lectures

### 4.2 Conditions for completing the course (evaluation criteria)

lectures - pass with oral or written assessment

test pass and open questions:

A: Questions in the field of messages to remember;

B: Questions in the field of speech to understand;

C: Solving a typical written task;

D: Solving an atypical writing task;

- for insufficient solution of tasks only from areas A and B = grade 2.0

- for solving tasks only from areas A and B, the possibility of obtaining max. rating 3.0

- for solving tasks from the area A + B + C, the possibility of obtaining max. evaluation 4.0

- for the solution of tasks in the area A + B + C + D, the possibility of obtaining a rating of 5.0

classes, seminars - credit with an assessment taking into account the student's skills, attendance, grades from partial tests

Knowledge assessment:

5.0 - the student demonstrates knowledge of each of the education content at the level of 88-100%

4.0 - the student demonstrates knowledge of each of the content of education at the level of 74-87%

3.0 - the student has knowledge of each of the content of education at the level of 60-73%

2.0 - the student has knowledge of each of the contents of education below 60%

Skill assessment:

5.0 - the student actively participates in the classes, is well prepared, correctly interprets the dependencies and is able to draw the right conclusions, recognizes correctly under the microscope the basic structural elements

4.5 - the student actively participates in classes, with little help from the teacher, correctly interprets the occurring phenomena, recognizes the basic structural elements correctly under the microscope

4.0 - the student actively participates in classes, with more help from the teacher, is improved, not always able to solve the problem by himself and recognize the basic structural elements under the microscope

3.5 - the student participates in classes, his scope of preparation does not allow for a comprehensive presentation of the discussed problem, he draws incorrect conclusions without help and incorrectly recognizes under the microscope the basic structural elements

3.0 - student participates in classes, formulates conclusions requiring correction from the teacher, but commits minor mistakes, not fully understanding dependencies and cause-and-effect relationships, commits a lot of mistakes while recognizing under the microscope the basic structural elements

2.0 - the student passively participates in classes, his statements are incorrectly substantive, he does not understand problems, he incorrectly recognizes basic structural elements under the microscope

#### 5. Total student workload required to achieve the desired result in hours and ECTS credits

Activity	Hours / student work
Hours of classes according to plan with the teacher	45
Preparation for classes	45
Participation in the consultations	3
The time to write a paper / essay	25
Preparation for tests	60
Participation in colloquia	2
Other (e-learning)	-
<b>SUM OF HOURS</b>	<b>180</b>
<b>TOTAL NUMBER OF ECTS</b>	<b>6</b>

#### 6. TRAINING PRACTICES IN THE SUBJECT / MODUL

Number of hours	-
Rules and forms of apprenticeship	-

#### 6. LITERATURE

<p><b>READING:</b></p> <ol style="list-style-type: none"> <li>1. Immunologia. J. Gołąb, M. Jakóbsiak, W. Lasek, T. Stokłosa, Wydawnictwo Naukowe PWN, Warszawa 2012.</li> <li>2. Immunologia. D. Male, J. Brostoff, D.B. Roth, I. Roitt, wydanie polskie pod red. J. Żeromskiego. Elsevier Urban &amp; Partner, Warszawa 2008, wydanie 2.</li> <li>3. Podstawy immunologii. W. Ptak, M. Ptak, M. Szczepanik, Wydawnictwo PZWL Warszawa</li> </ol>
<p>Additional literature:</p> <ol style="list-style-type: none"> <li>1. Krótkie wykłady – immunologia. P.M. Lydyard, A. Whelan, M.W. Fanger, Wydawnictwo Naukowe PWN, warszawa 2012.</li> <li>2. Immunologia, podstawowe zagadnienia i aktualności. W. Lasek, Wydawnictwo Naukowe PWN, Warszawa 2005</li> <li>3. Immunologia kliniczna. M. Haeney, H. Chapel, S. Misgah, N. Snowden, Lublin 2009</li> </ol>

Acceptance Unit Manager or authorized person