Appendix number 1.5 to The Rector UR Resolution No. 12/2019

SYLLABUS

**concerning the cycle of education 2022-2028**

(date range)

* 1. BASIC INFORMATION CONCERNING THIS SUBJECT / MODULE

|  |  |
| --- | --- |
| Subject / Module | Basic immunology |
| Course code / module \* | Im / C |
| Faculty of (name of the leading direction) | College of Medical Sciences, University of Rzeszów |
| Department Name | College of Medical Sciences, University of Rzeszów |
| 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 |  |
| First and Last Name of the Teacher |  |

\* - 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** |
| 10 | 15 | - | - | 20 | - | - | - | 4 |

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

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| Knowledge of biology at an advanced level |

**3. OBJECTIVES, OUTCOMES, AND PROGRAM CONTENT USED IN TEACHING METHODS**

* 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)**

1. **Lectures**

|  |
| --- |
| Course contents  1. Introduction to issues related to immunology, short history of immunology, development of the immune system  2. Inflammation. Complement system  3. Regulation of immune response, immunological tolerance and immunomodulation  4. Interactions of the immune system with other elements of the human body  5. Hypersensitivity  6. Autoimmunity  7. Immunodiagnostics, practical examples   1. 8. Introduction to immunoprophylaxis and immunotherapyWprowadzenie do immunoprofilaktyki i immunoterapii |

**B**. **Seminars**

|  |
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| 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. Bymphocytes. 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

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| --- | --- | --- |
| 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)

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| --- |
| 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) | - |
| SUM OF HOURS | 180 |
| TOTAL NUMBER OF ECTS | **4** |

6. TRAINING PRACTICES IN THE SUBJECT / MODUL

|  |  |
| --- | --- |
| Number of hours | - |
| Rules and forms of apprenticeship | - |

1. LITERATURE

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| **READING:**  1. Immunologia. J. Gołąb, M. Jakóbisiak, W. Lasek, T. Stokłosa, Wydawnictwo Naukowe PWN, Warszawa 2012.  2. Immunlogia. D. Male, J. Brostoff, D.B. Roth, I. Roitt, wydanie polskie pod red. J. Żeromskiego. Elsevier Urban & Partner, Warszawa 2008, wydanie 2.  3. Podstawy immunologii. W. Ptak, M. Ptak, M. Szczepanik, Wydawnictwo PZWL Warszawa |
| Additional literature:   1. Krótkie wykłady – immunologia. P.M. Lydyard, A. Whelan, M.W. Fanger, Wydawnictwo Naukowe PWN, warszawa 2012. 2. Immunologia, podstawowe zagadnienia i aktualności. W. Lasek, Wydawnictwo Naukowe PWN, Warszawa 2005 3. Immunologia kliniczna. M. Haeney, H. Chapel, S. Misgah, N. Snowden, Lublin 2009 |

Acceptance Unit Manager or authorized person