

SYLLABUS

concerning the cycle of education 2021-2027 (date range)

Academic year 2022/2023

1. BASIC INFORMATION CONCERNING THIS SUBJECT

Subject	Basic immunology
Course code *	Im / C
Faculty of (name of the leading direction)	Faculty of Medicine, University of Rzeszow
Department Name	Faculty of Medicine, University of Rzeszow
Field of study	medical direction
level of education	uniform master's studies
Profile	General academic
Form of study	stationary / extramural
Year and semester	year II, semester IV
Type of course	obligatory
Language	English
Coordinator	Prof. Jacek Tabarkiewicz
First and Last Name of the Teachers	Prof. Jacek Tabarkiewicz M.D., Ph.D., Katarzyna Pogoda M.Sc.

* - According to the resolutions of Educational Unit

1.1. Forms of classes, number of hours and ECTS

Semester No.	Lecture	Exercise	Conversation	Laboratory	Seminar	Z P	Practical	Other	Number of points ECTS
IV	10		-	15	20	-	-		4

1.2. The form of class activities

X classes are in the traditional form

X classes are implemented using methods and techniques of distance learning

1.3 Examination Forms (exam, credit with grade or credit without grade)

2. BASIC REQUIREMENTS

Knowledge of biology at an advanced level

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

3.1 Objectives of this course

C1	Understanding the role and action of the immune system, factors regulating this system and pathogenesis and diagnostics of immune disorders and 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

EK (the effect of education)	The content of learning outcomes defined for the class (module)	Reference to directional effects ¹
EK_01	Student 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	Students describes the main histocompatibility complex	C.W21
EK_03	Student knows the types of hypersensitivity reactions, types of immunodeficiency	C.W22
EK_04	Student knows the basics issues in the field of cancer immunology	C.W23
EK_05	Student knows the issues of immunodeficiency 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	Student 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	Student 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	Student uses an antigen-antibody reaction in modern modifications and techniques for the diagnosis of infectious, allergic, autoimmune diseases, blood and cancer diseases	C.U8

¹In the case of a path of education leading to obtaining teaching qualifications, also take into account the learning outcomes of the standards of education preparing for the teaching profession.

EK_09	Student associates images of tissue and organ damage with clinical symptoms of the disease, history and results of laboratory tests	C.U11
EK_10	Student shall correlate the reactive, defensive and adaptive changes in lab tests with disease etiology, clinical symptoms and anamnesis data	C.U12
EK_11	Student plans and performs a simple scientific study and interprets its results and draws conclusions	B.U14

3.3 CONTENT CURRICULUM

Course contents	Hours
Lectures	
1. Introduction to issues related to immunology, short history of immunology, development of the immune system	1
2. Inflammation. Complement system	2
3. Regulation of immune response, immunological tolerance and immunomodulation	2
4. Interactions of the immune system with other elements of the human body	2
5. Hypersensitivity	1
6. Autoimmunity	1
7. Immunodiagnostics, practical examples	1
Seminars	
1. Introduction to immunology. Anatomical structures 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.	4
2. A specific immune response. MHC system. An immunological synapse. Cellular immunity. Specific issues: MHC system, the concept of antigen, antigen presenting cells, maturation of T, NK and NKT lymphocytes, positive and negative selection in thymus, MHC restriction, antigen presentation to T lymphocytes, activation of T lymphocytes, TCR, lymphocyte cytotoxicity mechanisms, immunological memory.	4
3. A specific humoral immune response. Specific issues: Humoral immune response, B cells maturation, positive and negative selection of B cells, 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 and cellular immune response.	4
4. Cytokines and their receptors.	4

Specific issues: basic features and properties of cytokines, cytokine receptors and signaling pathways, interleukins, hematopoietic factors and other growth factors, interferons, superfamily of TNF molecules, chemokines, use of cytokines and their receptors in medicine	
5. Immune system in mucous membranes and skin. Immune response to infectious pathogen. Specific issues: MALT, GALT, immunity in respiratory and reproductive tract, oral tolerance, cells of the skin's immune system, characteristics and differences in the immune response against bacteria, viruses, parasites and fungi. Immunotherapy and vaccination.	4
Labs	
1. Cells of the immune system. Non-specific immune response. phagocytosis	1
2. CD molecules (cluster of differentiation). Cytometric evaluation of phagocytosis and oxygen burst	2
3. Subpopulations and role of T lymphocytes, NK and NKT cells. Cytotoxic response	1
4. Immunophenotyping of T, NK, NKT cells subpopulations	2
5. B lymphocytes. Antibodies. Monoclonal antibodies	1
6. Methods for assessing maturity and function of B lymphocytes	2
7. Primary immune deficiencies	2
8. Analysis of the results of tests of patients with primary immune deficiencies	1
9. Secondary immune deficiencies	2
10. Application of immunology in modern medicine: scientific research, diagnostics, therapy	1

3.4 Didactic 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

Specific issues:

Laboratory:

Each student must complete all exercises. Exercises are performed by all students. Each task is performed in groups of 2-3 students. It is necessary to pass: correct performance of practical tasks and demonstrating a sufficient level of theoretical knowledge related to the subject of the exercises.

- in the case of unexcused absence, the exercise should perform laboratory class with another group
- in the case of excused absence and the inability to take up classes with another group, the theoretical part should be pass during teacher's consultation hours. The student shall do this in TWO approaches until to the next classes (if not student is not allowed to participate in next classes).
- absences due to holidays should be pass during teacher's consultation hours. The student shall do this in TWO approaches
- in the case of unauthorized absences, the student is NOT admitted to the exam session.
- at EACH laboratory classes, teachers are required to asses knowledge and skills of ALL students on the negative / positive / „outstanding” rating scale.
- positive passing of all laboratory class is NECESSARY to be allowed to take final test.
- in the case of a negative assessment of the student's knowledge by the teacher, the theoretical part should be pass during teacher's consultation hours. The student shall do this in TWO approaches until to the next classes (if not student is not allowed to participate in next classes).
- the teacher, due to too many students in classes, has the right to not allow students making up classes to participate in classes with another group.
- laboratory footwear and white coat must be used during laboratory classes, outerwear should be left in the cloakroom
- on the first exercises, students confirm that they have been acquainted with the abovementioned rules and received answers to all their questions about the rules in laboratory rooms
- the final grade from the laboratory classes is the grade from the final test

SEMINARS

- in the case of unexcused absence, the exercise should perform seminar with another group
- in the case of excused absence and the inability to take up classes with another group, the theoretical part should be pass during teacher's consultation hours. The student shall do this in TWO approaches until to the next classes (if not student is not allowed to participate in next classes).
- absences due to holidays should be pass during teacher's consultation hours. The student shall do this in TWO approaches
- in the case of unauthorized absences, the student is NOT admitted to the exam session.

- at EACH seminar, teachers are required to assess knowledge and skills of ALL students on the negative / positive / „outstanding” rating scale.
- positive passing of all seminars is NECESSARY to be allowed to take final test.
- in the case of a negative assessment of the student's knowledge by the teacher, the theoretical part should be passed during teacher's consultation hours. The student shall do this in TWO approaches until the next classes (if not student is not allowed to participate in next classes).
- the teacher, due to too many students in classes, has the right to not allow students making up classes to participate in classes with another group.
- outerwear should be left in the cloakroom
- at the first seminar, students confirm that they have been acquainted with the abovementioned rules and received answers to all their questions about the rules.
- the final grade from the seminars is the grade from the final test

LECTURES

- attendance at lectures is obligatory

FINAL TEST.

- The test lasts 90 minutes from the start of the answering - all students in the room took their places, the teacher presented the applicable rules, resolved all doubts and answered all questions of students participating in the exam, the student representative confirmed by signature that the students taking part in the exam had the opportunity to familiarize themselves with the rules and obtained answers to all questions. The test will be performed in traditional way (printed questionnaire) or with the use of electronic platforms and computers located in rooms of UR.
- The test consists of 100 multiple (4) choice questions with one correct answer.
- positive completion of ALL exercises and seminars is NECESSARY to take the final test.
- Students leave all handbags, bags etc. in the room in a specially designated place. During the final test, the student may only carry writing implements, drinking water. Mobile phones must be turned off.
- Any attempt to communicate between students and cheating result immediate stopping of test for cheating students and negative (2.0) grade
- Any attempt to use electronic devices including a mobile phone will be treated as cheating.
- Students remain in place (even if they finish answering test earlier) until the final test is completed by all students.

- Any comments on the test, including the correctness of the questions, may be raised only during the test by raising the hand and describing problems on the sheet given by teacher. The result of the analysis of comments considering test will be given to student via Virtual University portal or in person. If the substantive error in the question is confirmed, the question is canceled and the percentages listed below are calculated in relation to the new number of questions.
- An unexcused absence from the final test results in a negative (2.0) grade.
- Absence from the final test can only be excused by the rector's / dean's or medical certificate submitted within 3 days from the final test day to the Dean's Office and the Human Immunology Department. Failure to submit the certificate within this period will result in negative assessment.
- The possibility of taking the final test before exam session will be considered individually, for students who obtained min. 6 overall „outstanding” scores from exercises and seminars. The results of the "early term" is counted as the final grade. IT IS NOT POSSIBLE TO RETAKE FINAL TEST IF THE GRADE WAS POSITIVE (≥ 3.0).
- Students who demonstrate outstanding (at least 8 distinguishing marks) achievements during the classes will be eligible for a bonus (+0.5) added to the final exam grade. In order to receive the bonus beyond the 8 distinguishing marks, it will be necessary to prepare a presentation of a clinical case. The bonus will be added to the final score based on the number of points obtained from the test. If the student receives a negative grade (2.0), the bonus does not increase the grade to a satisfactory grade (3.0) and it is not possible to convert the bonus into an additional point/s. If student receives negative grade in the first term and a positive grade in the retake exam, the bonus would be added to the grade resulting from the scores obtained in the retake.
- Grading scale:
 - 5.0 - 93% -100% of correct answers
 - 4.5 - 85% -92% of correct answers
 - 4.0 - 77% -84% of correct answers
 - 3.5 - 69% -76% of correct answers
 - 3.0 - 61% -68% of correct answers
 - 2.0 - below and equal to 60% of correct answers
- Students who have received 9 or 10 „outstanding” grades from exercises and seminars will get +0.5 to the final test grade based on the points received. This bonus is added only to positive grades – min. 3.0 and is not convertible to points from test e.g. if student miss one point to 3.0 and received bonus it cannot be converted to missing point.

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

Activity	The average number of hours to complete the activity
Contact hours (with the teacher) resulting from the study schedule of classes	45
Contact hours (with the teacher) participation in the consultations, exams	15
Non-contact hours - student's own work (preparation for classes, exam, writing a paper, etc.)	120
SUM OF HOURS	180
TOTAL NUMBER OF ECTS	6

** It should be taken into account that 1 ECTS point corresponds to 25-30 hours of total student workload.*

6. TRAINING PRACTICES IN THE SUBJECT

NUMBER OF HOURS	-
RULES AND FORMS OF APPRENTICESHIP	-

7. LITERATURE

<p>Basic literature:</p> <p>1. Cellular and Molecular Immunology, 10th Edition 2021 Authors: Abul K. Abbas & Andrew H. Lichtman & Shiv Pillai</p>
<p>Additional literature</p> <p>1. Basic Immunology Functions and Disorders of the Immune System Author: Abul K. Abbas Andrew H. H. Lichtman 6th revised edition November 2019</p> <p>2. ROITT'S ESSENTIAL IMMUNOLOGY AUTHOR: PETER J. DELVES SEAMUS J. MARTIN IVAN M. ROITT DENNIS R. BURTON 13TH EDITION JANUARY 2017</p>

Acceptance Unit Manager or authorized person