



## *Introduction to Clinical Immunology*

| <b>1. IMPRINT</b>                                            |                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Academic Year</b>                                         | 2025/2026                                                                                                                                                                                                                                                                                                                                  |
| <b>Department</b>                                            | Faculty of Medicine and Dentistry                                                                                                                                                                                                                                                                                                          |
| <b>Field of study</b>                                        | English Dentistry Division                                                                                                                                                                                                                                                                                                                 |
| <b>Main scientific discipline</b>                            | Medical Science                                                                                                                                                                                                                                                                                                                            |
| <b>Study Profile</b>                                         | General academic                                                                                                                                                                                                                                                                                                                           |
| <b>Level of studies</b>                                      | Uniform MSc                                                                                                                                                                                                                                                                                                                                |
| <b>Form of studies</b>                                       | Full-time studies                                                                                                                                                                                                                                                                                                                          |
| <b>Type of module / course</b>                               | Obligatory                                                                                                                                                                                                                                                                                                                                 |
| <b>Form of verification of learning outcomes</b>             | Completion                                                                                                                                                                                                                                                                                                                                 |
| <b>Educational Unit / Educational Units</b>                  | <p>Department of Immunology<br/>                     5 Nielubowicza St.<br/>                     02-097 Warsaw<br/>                     Phone: 22 599 21 99</p> <p>Laboratory of Experimental Medicine<br/>                     5 Nielubowicza St.<br/>                     02-097 Warsaw<br/>                     Phone: 22 599 21 89</p> |
| <b>Head of Educational Unit / Heads of Educational Units</b> | <p>Prof. Jakub Golab, MD, PhD (Department of Immunology)</p> <p>Prof. Dominika Nowis, MD, PhD (Laboratory of Experimental Medicine)</p>                                                                                                                                                                                                    |
| <b>Course coordinator</b>                                    | Prof. Dominika Nowis, MD, PhD; dominika.nowis@wum.edu.pl                                                                                                                                                                                                                                                                                   |
| <b>Person responsible for syllabus</b>                       | Prof. Dominika Nowis, MD, PhD; dominika.nowis@wum.edu.pl                                                                                                                                                                                                                                                                                   |
| <b>Teachers</b>                                              | <p>Prof. Jakub Golab, MD, PhD; jakub.golab@wum.edu.pl</p> <p>Prof. Dominika Nowis, MD, PhD; dominika.nowis@wum.edu.pl</p>                                                                                                                                                                                                                  |

| <b>2. BASIC INFORMATION</b>                   |                        |                                 |      |
|-----------------------------------------------|------------------------|---------------------------------|------|
| <b>Year and semester of studies</b>           | 2nd year, 1st semester | <b>Number of ECTS credits</b>   | 1.50 |
| <b>FORMS OF CLASSES</b>                       | <b>Number of hours</b> | <b>ECTS credits calculation</b> |      |
| <b>Contacting hours with academic teacher</b> |                        |                                 |      |
| Lecture (L)                                   | 10 (8 as e-learning)   | 0.33                            |      |
| Seminar (S)                                   | 10                     | 0.45                            |      |
| Classes (C)                                   |                        |                                 |      |
| e-learning (e-L)                              |                        |                                 |      |
| Practical classes (PC)                        |                        |                                 |      |
| Work placement (WP)                           |                        |                                 |      |
| <b>Unassisted student's work</b>              |                        |                                 |      |
| Preparation for classes and completions       | 22                     | 0.72                            |      |

| <b>3. COURSE OBJECTIVES</b> |                                                                                                                                                                                                                                                                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| O1                          | To familiarize students with the structure and functioning of the human immune system                                                                                                                                                                                      |
| O2                          | To familiarize the student with the basic mechanisms of induction and development of the immune response and the processes underlying the development of allergic diseases, autoimmune diseases, cancer, transplant rejection and primary and secondary immunodeficiencies |
| O3                          | To familiarize the student with the use of antibodies, cytokines and cells belonging to the immune system for diagnostic and therapeutic purposes                                                                                                                          |

| <b>4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING</b>             |                                 |
|-------------------------------------------------------------------------------------------|---------------------------------|
| <b>Code and number of the effect of learning in accordance with standards of learning</b> | <b>Effects in the field of:</b> |
| <b>Knowledge – Graduate* knows and understands:</b>                                       |                                 |

|        |                                                                                                                                                                                |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C.W7.  | structure of the immune system and its role                                                                                                                                    |
| C.W8.  | humoral and cellular mechanisms of innate and acquired immunity and mechanisms of hypersensitivity reactions and autoimmune processes                                          |
| C.W11. | principles of immunodiagnostics and immunomodulation                                                                                                                           |
| C.W12. | pathomechanism of allergic diseases, selected hypersensitivity, autoimmune and immunodeficiency diseases                                                                       |
| C.W13. | the concepts of homeostasis, adaptation, resistance, immunity, susceptibility, propensity, vulnerability, compensatory mechanisms, feedback and the "vicious circle" mechanism |
| C.W15. | mechanisms of inflammatory reaction and wound healing                                                                                                                          |

**Skills– Graduate\* is able to:**

|   |   |
|---|---|
| - | - |
|---|---|

## 5. ADDITIONAL EFFECTS OF LEARNING

| Number of effect of learning | Effects in the fields of: |
|------------------------------|---------------------------|
|------------------------------|---------------------------|

**Knowledge – Graduate knows and understands:**

|   |   |
|---|---|
| - | - |
|---|---|

**Skills– Graduate is able to:**

|    |   |
|----|---|
| U1 | - |
|----|---|

**Social Competencies – Graduate is ready for:**

|    |   |
|----|---|
| K1 | - |
|----|---|

## 6. CLASSES

| Form of class | Class contents                                                                                                                                                                                                                                                                                                                                                                                                            | Effects of Learning  |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Lectures      | Lecture 1 - Lecture topic: Introduction to immunology. Organization of the immune system.<br>Educational content: main functions of the immune system; innate and adaptive immunity, humoral and cellular immune responses; the most important molecules of the immune system.                                                                                                                                            | C.W7., C.W8.         |
|               | Lecture 2 - Lecture topic: Therapeutic and diagnostic applications of monoclonal antibodies.<br>Educational content: biological functions of antibodies, methods of monoclonal antibodies generation, modifications of monoclonal antibodies for diagnostics and therapy, diagnostic techniques using antibodies (ELISA, Western blotting, immunoprecipitation, immunofluorescence microscopy, immunoelectron microscopy, | C.W7., C.W8., C.W11. |

**Załącznik nr 4C do Procedury opracowywania i okresowego przeglądu programów studiów**  
**(stanowiącej załącznik do zarządzenia nr 68/2024 Rektora WUM z dnia 18 kwietnia 2024 r.)**

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                         |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | <p>immunohistochemistry), examples of applications of monoclonal antibodies in diagnosis and treatment of human diseases.</p> <p>Lecture 3 - Lecture topic: Mucosal immunity.<br/>Educational content: structure and function of the mucosa-associated immune system, role of IgA antibodies, M cells, and defensins.</p> <p>Lecture 4 - Lecture topic: Maturation and circulation of lymphocytes.<br/>Educational content: site and mechanisms of T lymphocyte maturation. Rearrangement of genes encoding the T lymphocyte receptor, positive and negative selection of lymphocytes, mechanisms of central immune tolerance. Lymphocyte circulation, stages of lymphocyte exit from the vessels, adhesion molecules and cytokines involved in lymphocyte circulation. Differences in the circulation of naïve and memory lymphocytes.</p> <p>Lecture 5 - Lecture topic: Anti-infective immunity - part 1.<br/>Educational content: basics of antiviral and anti-intracellular microorganisms' response, mechanisms of immune response evasion by microorganisms.</p> <p>Lecture 6 - Lecture topic: Anti-infectious immunity - part 2.<br/>Educational content: basics of antiparasitic, antifungal, and anti-extracellular bacteria response, mechanisms of immune response evasion by microorganisms, vaccines.</p> <p>Lecture 7 - Lecture topic: Hypersensitivity and allergic diseases.<br/>Educational content: pathogenesis of type I hypersensitivity, role of Th2 lymphocytes and IgE antibodies in allergies, mechanisms of mast cell activation and their effector functions, allergen immunotherapy, therapeutics strategies used in allergic diseases.</p> <p>Lecture 8 - Immune tolerance and autoimmune diseases.<br/>Educational content: central and peripheral mechanisms of autoantigen tolerance, factors promoting development of autoimmune diseases, pathomechanism of selected autoimmune diseases, basic introduction to the therapy of autoimmune diseases.</p> <p>Lecture 9 - Lecture topic: Immunology and immunotherapy of cancer.<br/>Educational content: anti-tumor immunity, how cancer cells try to escape immune surveillance, cancer immunotherapy.</p> <p>Lecture 10 - Lecture topic: Secondary immunodeficiencies, HIV infection.<br/>Educational content: epidemiology of HIV infection, structure and life cycle of the virus, impact of HIV on the immune system, clinical manifestations of infection, antiretroviral therapy, status of HIV vaccine research.</p> | <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8., C.W11., C.W12.</p> <p>C.W7., C.W8., C.W12.</p> <p>C.W7., C.W8., C.W12.</p> <p>C.W7., C.W8., C.W12.</p> |
| Seminars | <p>Seminar 1 - Seminar topic: The role of the immune system. Structure of lymphoid organs. Structure of antibodies and T-cell antigen receptors. Classes and subclasses of antibodies - biological significance. Applications of monoclonal antibodies and their derivatives. Educational content - as above.</p> <p>Seminar 2 - Seminar topic: Sources of diversity of antibodies and T cell receptors (TCRs). Major histocompatibility system. Presentation of</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>C.W7., C.W8., C.W11., C.W13.</p> <p>C.W7., C.W8., C.W13.</p>                                                                                                                                         |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                      |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|  | <p>antigens to T lymphocytes. Development of the immune response. Educational content - as above.</p> <p>Seminar 3 - Seminar topic: Innate immunity. Function of the complement system. Interferons. Functions of macrophages and granulocytes. Natural and antibody-dependent cell-mediated cytotoxicity. Mechanisms of lymphocyte cytotoxicity. Mechanisms of immunity in mucous membranes, with special emphasis on the oral cavity. Educational content - as above.</p> <p>Seminar 4 - Seminar topic: Abnormalities of the immune response (allergies and autoimmune diseases). Transplant immunology. Educational content - as above</p> <p>Seminar 5 - Seminar topic: Anti-tumor immunity. Credit Colloquium. Completion by students of the Questionnaire for Evaluation of Classes and Academic Teachers. Educational content - as above</p> | <p>C.W7., C.W8., C.W13., C.W15.</p> <p>C.W7., C.W8., C.W11., C.W12., C.W13.</p> <p>C.W7., C.W10., C.W11., C.W13.</p> |
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## 7. LITERATURE

### Obligatory

Kenneth M. Murphy, Casey Weaver, Leslie J. Berg. Janeway's Immunobiology (Tenth Edition), W. W. Norton & Company, 2022

### Supplementary

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## 8. VERIFYING THE EFFECT OF LEARNING

| Code of the course<br>effect of learning     | Ways of verifying the effect of learning                                                                                                                                                                                                                                                                                                               | Completion criterion                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C.W7., C.W8., C.W11., C.W12., C.W13., C.W15. | <p>Oral check of preparation for each seminar</p> <p>The test colloquium covers the content presented in lectures and seminars.</p> <p>The first term of the colloquium is a MCQ (25 questions - 13 single-choice and 12 multiple-choice). The second term of the colloquium is oral - answering 5 questions from a drawn set with your assistant.</p> | <p>Attendance at all seminars and lectures; familiarization with the content of lectures available through e-learning.</p> <p>Active participation in seminars.</p> <p>Obtaining more than 50% of the maximum number of points</p> <p>2.0 (unsatisfactory) &lt;13 pts.<br/>3.0 (poor) 13-15 pts.<br/>3.5 (satisfactory) 16-17 pts.<br/>4.0 (good) 18-20 pts<br/>4.5 (very good) 21-23 pts.<br/>5.0 (excellent) 24-25 pts.</p> |

## 9. ADDITIONAL INFORMATION

Person responsible for organizing the teaching: Prof. Dominika Nowis, MD, PhD; email: [dominika.nowis@wum.edu.pl](mailto:dominika.nowis@wum.edu.pl)

Lectures are organized in five cycles, each consisting of two sessions. The first cycle is conducted in person, while the remaining sessions take place synchronously on the MS Teams platform. Attendance and engagement with lecture content are mandatory and subject to verification. In order to receive credit for an online lecture, students must be actively present for at least 50% of its duration.

Seminars are held exclusively in person. Attendance at all seminars is compulsory and verified via an attendance list.

In exceptional cases, a student who is absent from a seminar or lecture cycle due to a documented medical condition must make up the missed classes. This may take the form of an oral examination (three questions related to the respective seminar or lecture, based on the assigned readings) or a written test conducted by the course assistant. A scanned copy of the medical exemption must be submitted via e-mail to the Secretariat of the Department of Immunology ([immunologia@wum.edu.pl](mailto:immunologia@wum.edu.pl)) no later than seven days after the absence. Students are permitted one excused medical absence from a seminar and one from a lecture cycle.

The program of immunology classes, including seminar topics and the required chapters from the textbook Immunobiology, is available on the Department's website: <https://immunologia.wum.edu.pl/english-dentistry-division>

Additionally, the Department of Immunology hosts a Student Scientific Group, supervised by Dr. Zofia Pilch (e-mail: [zofia.pilch@wum.edu.pl](mailto:zofia.pilch@wum.edu.pl)).

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**ATTENTION**

The final 10 minutes of the last class of the block/semester/year should be allotted for students to fill out the Survey of Evaluation of Classes and Academic Teachers