



**Medical University of Warsaw**  
**Faculty of Medicine - English Division**  
**61 Żwirki i Wigury Street**  
**02-091 Warsaw, Poland**

[http:// www.wum.edu.pl/](http://www.wum.edu.pl/)

**2<sup>nd</sup> YEAR CURRICULUM**

**6-year program**

**Academic year: 2024/2025**

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## **AUTHORITIES OF MEDICAL UNIVERSITY OF WARSAW – TERM 2024-2028**

**Rector** – Professor Rafał Krenke, MD, PhD

**Vice Rector for Student Affairs and Education** – Professor Marek Kuch, MD, PhD

**Vice Rector for Science and Technology Transfer** – Professor Marcin Sobczak, MD, PhD

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**Vice Rector for International Relations, Development and Promotion** – Professor Michał Grąt, MD, PhD

## **FACULTY AUTHORITIES OF MEDICAL UNIVERSITY OF WARSAW – TERM: 2024-2028**

**Faculty of Medicine** – Professor Paweł Włodarski MD, PhD

**English Division – Faculty of Medicine** – Assoc. Prof. Jacek Sieńko, MD, PhD.

## **DEAN'S OFFICE**

**Head of the Dean's Office** – Krystyna Jarzab, MA

**Student Administration Officer (1st, 2nd and 3rd -Year)** – Aleksandra Chilecka

**Student Administration Officer (4th, 5th, 6th -Year)** – Dominka Renik, MA and Patrycja Karpińska, MA

## **STUDENT GOVERNMENT REPRESENTATIVES:**

**President** – Alexis Vourtsis

**YEAR REPRESENTATIVE:**

**Vice President, Head of Academic Affairs** – Alexander Steiner

Haroon Tahir – 2 year

**Vice President, Head of Student Affairs** – Sylvie Marie Régine Etienne

**Head of Communications and Administrative Management** – Maria Kienitz

**Social Media Coordinator** – Michail Koutentakis

**Events Coordinator** – Dyia Bachour

**Events Coordinator** – Divit Amarnani

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## SCHEDULE – ACADEMIC YEAR 2024/2025

### 6-year program

#### **WINTER SEMESTER – 01.10.2024 – 16.02.2025**

STUDENT'S ACADEMIC CLASSES:	01.10.2024 – 22.12.2024
	07.01.2025 – 26.01.2025
WINTER HOLIDAYS:	23.12.2024 – 06.01.2025
<b>EXAM SESSION:</b>	<b>27.01.2025 – 02.02.2025</b>
DAYS OFF BETWEEN SEMESTER:	03.02.2025 – 09.02.2025
RETAKE EXAM SESSION:	10.02.2025 – 16.02.2025

#### **SUMMER SEMESTER – 17.02.2025 – 30.09.2025**

STUDENT'S ACADEMIC CLASSES:	17.02.2025 – 18.04.2025
	05.05.2025 – 15.06.2025
EASTER HOLIDAYS:	19.04.2025 – 27.04.2025
SPRING HOLIDAYS:	28.04.2025 – 04.05.2025
DAYS OFF BEFORE EXAM SESSION:	16.06.2025 – 22.06.2025
<b>EXAM SESSION:</b>	<b>23.06.2025 – 11.07.2025</b>
SUMMER HOLIDAYS:	14.07.2025 – 30.09.2025
RETAKE EXAM SESSION:	01.09.2025 – 14.09.2025

Curriculum of the 2<sup>nd</sup> year of 6-year 2024/2025 ED program and the list of contents

2nd year

page	subject	form of credit	semester	Total no of hours	including				ECTS
					lecture	seminar	class	practical	
5	Biochemistry with Elements of Chemistry	exam	1&2	180	40	50	90		17
12	Cytophysiology	exam	1	45	10	10	25		2
19	Physiology with Pathophysiology	exam	1&2	220	65	65	90		19
34	Immunology	exam	2	40		40			3
39	Polish for Medicine	credit	1&2	60			60		5
45	Medical Ethics with Elements of Philosophy	credit	1	30	20	10			2
50	Genetics	credit	2	25		8	17		2
55	Medical Communication	credit	2	30	20		10		1
59	Hygiene and Epidemiology	credit	1	30		10	20		2
63	Research Methodology	credit	1	35	5	15	15		1
-	Optional course	credit	1&2	60		60			4
70	Vocational Training - Emergency medical care, family medicine	credit	2	120				120	4
				875	160	268	327	120	62



## Biochemistry with elements of chemistry

### 1. IMPRINT

<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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>	Exam
<b>Educational Unit / Educational Units</b>	Chair and Department of Biochemistry, First Faculty of Medicine 02-097 Warsaw, ul. Banacha 1 Phone: +48 (22) 57 20 693 e-mail: <a href="mailto:biochemia@wum.edu.pl">biochemia@wum.edu.pl</a> <a href="https://biochemia.wum.edu.pl">https://biochemia.wum.edu.pl</a>
<b>Head of Educational Unit / Heads of Educational Units</b>	Professor Marta Struga, MSc, PhD

<b>Course coordinator</b>	Professor Marta Struga, MSc, PhD; <a href="mailto:marta.struga@wum.edu.pl">marta.struga@wum.edu.pl</a> Phone: +48 (22) 57 20 693
<b>Person responsible for syllabus</b>	Ewa Usarek, PhD e-mail: <a href="mailto:eusarek@wum.edu.pl">eusarek@wum.edu.pl</a>
<b>Teachers</b>	Alicja Chrzanowska, PhD; <a href="mailto:alicja.chrzanowska@wum.edu.pl">alicja.chrzanowska@wum.edu.pl</a> Magdalena Długołęcka, MSc; <a href="mailto:magdalena.dlugolecka@wum.edu.pl">magdalena.dlugolecka@wum.edu.pl</a> Alicja Głuszko, PhD; <a href="mailto:alicja.gluszko@wum.edu.pl">alicja.gluszko@wum.edu.pl</a> Wojciech Graboń, PhD; <a href="mailto:wojciech.grabon@wum.edu.pl">wojciech.grabon@wum.edu.pl</a> Dagmara Kurpios-Piec, PhD; <a href="mailto:dagmara.kurpios-piec@wum.edu.pl">dagmara.kurpios-piec@wum.edu.pl</a> Magdalena Mielczarek-Puta, PhD; <a href="mailto:magdalena.mielczarek-puta@wum.edu.pl">magdalena.mielczarek-puta@wum.edu.pl</a> Dagmara Otto-Ślusarczyk, PhD; <a href="mailto:dagmara.otto@wum.edu.pl">dagmara.otto@wum.edu.pl</a> Michał Skrzycki, PhD; <a href="mailto:michal.skrzycki@wum.edu.pl">michal.skrzycki@wum.edu.pl</a> Karolina Soroczyńska, MSc; <a href="mailto:karolina.soroczynska@wum.edu.pl">karolina.soroczynska@wum.edu.pl</a> Jolanta Szymańska-Majchrzak, PhD; <a href="mailto:jolanta.szymanska@wum.edu.pl">jolanta.szymanska@wum.edu.pl</a> Ewa Usarek, PhD; <a href="mailto:ewa.usarek@wum.edu.pl">ewa.usarek@wum.edu.pl</a> Łukasz Zaręba, MD; <a href="mailto:lukasz.zareba@wum.edu.pl">lukasz.zareba@wum.edu.pl</a> Barbara Żyżyńska-Granica, PhD; <a href="mailto:barbara.zyzynska@wum.edu.pl">barbara.zyzynska@wum.edu.pl</a>

## 2. BASIC INFORMATION

<b>Year and semester of studies</b>	II year, 3&4 semester	<b>Number of ECTS credits</b>	17.00
<b>FORMS OF CLASSES</b>		<b>Number of hours</b>	<b>ECTS credits calculation</b>
<b>Contacting hours with academic teacher</b>			
Lecture (L)		40	3.0
Seminar (S)		50	4.0
Classes (C)		90	5.0
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
<b>Unassisted student's work</b>			
Preparation for classes and completions		190	5.0

## 3. COURSE OBJECTIVES

O1	To develop a solid understanding of the structures, properties, and metabolism of substances present in the body: proteins, carbohydrates, lipids, nucleic acids, vitamins, hormones; control and integration of metabolic pathways
O2	To give insight into understanding how metabolic processes can contribute to an explanation of pathological phenomena.
O3	To give the students experience in biochemical methodology to appreciate the clinical biochemistry techniques as diagnostic tools and to be able to interpret the results for appropriate diagnosis and follow up of patients.

**4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING** (*concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study*)

**Code and number of effect of learning in accordance with standards of learning**

**Effects in the field of:** (*in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019*)

**Knowledge – Graduate\* knows and understands:**

B.W1	Water and electrolyte balance in biological systems
B.W2	Acid-base balance and the mechanism of buffer action and their importance in organism homeostasis
B.W3	terms: solubility, osmotic pressure, isotonia, colloid solutions and Gibbs-Donnan equilibrium;
B.W4	Basic reactions of organic and inorganic compounds in water solutions
B.W10	Structure of organic and inorganic compounds present in cells, extracellular matrix and body fluids
B.W11	Structure of lipids and polysaccharides and their roles in cellular and extracellular structures
B.W12	Primary, secondary, tertiary and quaternary structures of proteins, as well as the posttranslational and functional modifications of proteins and their importance
B.W13	Functions of nucleotides in the cell, the primary and secondary structure of DNA and RNA and the structure of chromatin
B.W14	Functions of the genome, transcriptome and human proteome and the basic methods used in their study; processes of replication, repair and recombination of DNA, transcription and translation and degradation of DNA, RNA and proteins; knows the concepts of the gene expression regulation
B.W15	Basic catabolic and anabolic pathways, how they are regulated by genetic and environmental factors
B.W16	Metabolic profiles of the main organs and systems
B.W17	Ways of communication between cells, as well as between the cell and the extracellular matrix and the pathways of transmitting signals in the cell and examples of disruption of these processes leading to cancer and other diseases
B.W25	Relationship between disturbing the balance between biological factors and physiological and pathophysiological changes

**Skills– Graduate\* is able to:**

B.U3	Calculate the molar and percent concentrations of compounds and the concentrations of substances in single and multi-component isotonic solutions
B.U4	Calculate the solubility of inorganic compounds, determine the chemical background of solubility of organic compounds or the lack of solubility and understand its practical meaning to dietetics and therapy

B.U5	Determine the pH of a solution and the influence of pH variations on organic and inorganic compounds
B.U6	Predict the direction of metabolic processes in terms of the energy state of cells
B.U8	Use the basic laboratory techniques, such as qualitative analysis, titration, colorimetric analysis, pH-metry, chromatography, electrophoresis of proteins and nucleic acids
B.U9	Use the basic measurement equipment and assess the precision of the measurements
B.U13	Plan simple research and interpret the results and draw conclusions

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

<b>5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)</b>	
<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
<b>Knowledge – Graduate knows and understands:</b>	
K1	
<b>Skills– Graduate is able to:</b>	
S1	
<b>Social Competencies – Graduate is ready for:</b>	
SC1	

<b>6. CLASSES</b>		
<b>Form of class</b>	<b>Class contents</b>	<b>Effects of Learning</b>
Lectures	1. Water and electrolyte balance in biological system	B.W1., B.W2., B.W3.
	2. Basic reactions of inorganic compounds in water solutions. Mechanism of buffer action and their importance in organism homeostasis	B.W2., B.W4.
	3. Characterization of main groups of organic compounds. Isomerism	B.W4., B.W10.
	4. Proteins	B.W12.
	5. Enzymes	B.W15., B.W25., B.U5.
	6. Nucleic acids structure, DNA replication	B.W13., B.W14.
	7. Expression of genetic information: transcription, translation	B.W13., B.W14.
	8. Tissue oxidation	B.W15.
	9. Carbohydrates metabolism, part 1	B.W11., B.W15., B.W16., B.W25.
	10. Carbohydrates metabolism, part 2	B.W11., B.W15., B.W16., B.W25.
	11. Lipids metabolism, part 1	B.W11., B.W15., B.W16., B.W25.
	12. Lipids metabolism, part 2	B.W11., B.W15., B.W16., B.W25.



	13. Protein turnover, ureogenesis	B.W15., B.W16., B.W25.
	14. Amino acids metabolism	B.W15., B.W16., B.W25.
	13. Blood	B.W16., B.W25.
	16. Metabolism of purine and pyrimidine nucleotides	B.W15., B.W25.
	17. Vitamins and hormones	B.W15., B.W16., B.W17., B.W25.
	18. Metabolism in the liver	B.W15., B.W16., B.W25., B.U6.
	19. Biotransformation; metabolism of ethanol	B.W15., B.W25., B.U6.
	20. Summary of the metabolism	B.W11., B.W15., B.W16., B.W25., B.U6.
Seminars	1. Chemical calculations (concentrations)	B.W1., B.W2., B.U3.
	2. Biochemical calculations (buffers)	B.W1., B.W2., B.W3., B.U4., B.U5.
	3. Analysis of organic compounds and inorganic ions	B.W4.
	4. Proteins	B.W12.
	5. Enzymes	B.W15., B.W25., B.U6.
	6. Nucleic acids	B.W13., B.W14.
	7. Tissue oxidation	B.W15.
	8, 9. Metabolism of carbohydrates	B.W11., B.W15., B.W16., B.W25., B.U6.
	10, 11. Metabolism of lipids	B.W11., B.W15., B.W16., B.W25., B.U6.
	12. Blood	B.W16., B.W25.
	13, 14. Ureogenesis, metabolism of amino acids	B.W15., B.W16., B.W25.
	15. Metabolism of purines, pyrimidines	B.W15., B.W25.
	16. Vitamins and hormones	B.W15., B.W16., B.W17., B.W25.
	17. Metabolism in the liver, biotransformation	B.W15., B.W16., B.W25., B.U6.
Classes	1. Basic laboratory techniques	B.U8., B.U9., B.U13.
	2. Acid – base balance in organism, buffers	B.W2., B.U3., B.U5., B.U8., B.U9., B.U13.
	3. Qualitative analysis of organic compound	B.W4., B.W10., B.U8., B.U9., B.U13.
	4. Amino acids and proteins	B.W10., B.U8., B.U9., B.U13.
	5. Proteins, properties and methods of separation	B.W3., B.U8., B.U9., B.U13.
	6. Enzymes	B.U6., B.U8., B.U9., B.U13.
	7. Enzymes - kinetics	B.U6., B.U8., B.U9., B.U13.
	8. Nucleic acids	B.W13., B.U8., B.U9., B.U13.
	9. Carbohydrates - chemical properties	B.W11., B.U8., B.U9., B.U13.
	10. Carbohydrates – biochemical properties	B.W11., B.U8., B.U9., B.U13.

	11. Lipids	B.W11., B.U8., B.U9., B.U13.
	12. Digestive enzymes	B.W16., B.U8., B.U9., B.U13.
	13. Blood constituents	B.W3., B.W16., B.W25., B.U8., B.U9., B.U13.
	14. Diagnostic enzymes	B.W25., B.U8., B.U9., B.U13.
	15. Urine constituents	B.W16., B.W25., B.U8., B.U9., B.U13.
	16. Biochemistry all around us	B.U8., B.U9., B.U13.

## 7. LITERATURE

### Obligatory

1. General Chemistry with Qualitative Analysis – Whitten, Davis, Peck, VI ed., Saunders College Publishing.
2. Introduction to Organic Chemistry – Brown, W.H. Saunders College Publishing.
3. Biochemistry Lippincott's Illustrated Reviews, D.R. Ferrier (R.A. Harvey ed.), Wolters Kluwer, Lippincott, Williams & Wilkins.
4. Harpers' biochemistry, R.K. Murray, D.K. Granner, P.A. Mayers, V.W. Rodwell, Appleton & Lange.

### Supplementary

1. An Introduction to Medicinal Chemistry, L.P. Graham, Oxford University Press.
2. Biochemistry. L. Stryer, W.H. Freeman & Company, New York.
3. Principles of Medical Biochemistry, G. Meisenberg, W.H. Simmons, Elsevier (online access + interactive extras, studentconsult.com).
4. Medical Biochemistry, J.W. Baynes, M.H. Dominiczak, Elsevier, (online access + interactive extras, studentconsult.com). Last edition.
5. Textbook of Biochemistry with clinical correlations, T.M. Devlin, Willey-Liss, Inc.

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
<i>e.g. G.K1, G.S1, K1</i>	<i>This field defines the methods used for grading students e.g. pop quiz, test, written report etc.</i>	<i>e.g. threshold number of points</i>
B.W1., B.W2., B.W3., B.W4., B.W10., B.W11., B.W12., B.W13., B.W14., B.W15., B.W16., B.W17., B.W25., B.U3., B.U4., B.U5., B.U6.	Continuous assessment during seminars – weekly tests	At least 60% of points
	Active discussion during seminars	Credit by the teacher
	Intermediate assessment tests (3 tests, 50 questions each, test questions with one correct answer)	At least 55% of points
	Final exam (test, 100 questions, test questions with one correct answer)	
B.W2., B.W3., B.W4., B.W10., B.W11., B.W13., B.W16., B.W25.	Continuous assessment during laboratory classes – weekly tests	At least 60% of points
	Written laboratory reports	Credit by the teacher
B.U3., B.U4., B.U5., B.U6., B.U8., B.U9., B.U10.		

**9. ADDITIONAL INFORMATION** (information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club)

Biochemistry course coordinator: Ewa Usarek [ewa.usarek@wum.edu.pl](mailto:ewa.usarek@wum.edu.pl)

Practical laboratory classes are held in the laboratory of the Biochemistry Department (Banacha St. 1, the building of the Faculty of Pharmacy, block I, the 1st floor).

Detailed schedules, updates, information, and useful files will be available on the e-learning platform from the beginning of October.

The Student is obligated to:

- attend all lectures, laboratory classes, and seminars (attendance list); being late for over 15 minutes is considered as an absence
- be prepared and participate in discussions during seminars and laboratory classes
- use university e-mail addresses [s0xxxx@student.wum.edu.pl](mailto:s0xxxx@student.wum.edu.pl)

It is not allowed:

- to copy lab reports, assignments, test or exam answers
- to allow that someone else could copy another Student's report/assignments/test/exam
- to use electronic devices to communicate or store data during the test or exam

The Student is entitled to 2 excused absences. Absence due to illness is excused only by a medical note/doctor's certificate. The student should notify the course coordinator within three business days.

Unexcused absences from classes are not allowed and may result in failing the entire course of biochemistry.

Unexcused absence from the intermediate assessment/s or exam means failing.

Students can get the credit for the whole course and can take the final exam if she/he credits laboratory classes, seminars, and three assessment tests. Students who don't achieve the credit from seminar or laboratory classes, or fail assessment test(s) are allowed to two retakes (the second retake is a commission retake, called conditional admission).

Grading:

- 0 - 54 % - 2.0
- 55 - 63 % - 3.0
- 64 - 73 % - 3.5
- 74 - 83 % - 4.0
- 84 - 92 % - 4.5
- 93 - 100 % - 5.0

The final grade may be increased by additional points in the case of good results of the intermediate tests:

- the average grade 4.75-5.00: 5 points
- the average grade 4.50-4.74: 3 points
- the average grade 4.25-4.49: 2 points

Students may join the Biochemistry Science Club "Explore"; the person responsible is Barbara Żyżyńska-Granica, [barbara.zyzynska@wum.edu.pl](mailto:barbara.zyzynska@wum.edu.pl)

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**ATTENTION**

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers



## Cytophysiology

<b>1. IMPRINT</b>	
<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<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>	exam
<b>Educational Unit / Educational Units</b>	<p>Department of Histology and Embryology            Center for Biostructure Research            02-004 Warszawa, Chałubińskiego 5 Str.(Anatomicum bldg.)    Web site:  <a href="http://histologia.wum.edu.pl">http://histologia.wum.edu.pl</a>            Department office is open for students on working days.            Business hours 9: 30 - 14: 00, tel/fax 22 629-5282.</p> <p>Department of Transplantology and Main Tissue Bank            Center for Biostructure Research            02-004 Warszawa, Chałubińskiego 5 Str.(Anatomicum bldg.)  <a href="https://transplantologia.wum.edu.pl/">https://transplantologia.wum.edu.pl/</a>            Department office is open for students on working days.            Business hours 9: 30 - 14: 00, tel./fax 22 621 75 43</p> <p>Department of Methodology            Preclinical Research Center Bldg.            02-091 Warszawa, 1b Banacha Street            Web site: <a href="http://metodologia.wum.edu.pl">http://metodologia.wum.edu.pl</a>  <a href="mailto:metodologia@wum.edu.pl">metodologia@wum.edu.pl</a></p>

	Department office is open for students on working days. Business hours 9: 30 - 14: 00
<b>Head of Educational Unit / Heads of Educational Units</b>	Jacek Malejczyk, Ph.D. Professor Artur Kamiński, M.D., Ph.D., Associate professor Paweł Włodarski, MD, PhD, Professor
<b>Course coordinator</b>	Jacek Malejczyk, Ph.D. Professor <a href="mailto:jacek.malejczyk@wum.edu.pl">jacek.malejczyk@wum.edu.pl</a>
<b>Person responsible for syllabus</b>	Jacek Malejczyk, Ph.D. Professor <a href="mailto:jacek.malejczyk@wum.edu.pl">jacek.malejczyk@wum.edu.pl</a>
<b>Teachers</b>	<p>Department of Histology and Embryology:  Jacek Malejczyk, Ph.D., Professor <a href="mailto:jacek.malejczyk@wum.edu.pl">jacek.malejczyk@wum.edu.pl</a>  Stanisław Moskalewski, M.D., Ph.D., Professor  <a href="mailto:stanislaw.moskalewski@wum.edu.pl">stanislaw.moskalewski@wum.edu.pl</a>  Anna Hyc, Ph.D., Associate professor <a href="mailto:anna.hyc@wum.edu.p">anna.hyc@wum.edu.p</a>  Anna Iwan, Ph.D., Associate professor <a href="mailto:anna.iwan@wum.edu.p">anna.iwan@wum.edu.p</a>  Izabela Młynarczuk-Biały, M.D., Ph.D., Associate professor  <a href="mailto:imlynarczuk@wum.edu.pl">imlynarczuk@wum.edu.pl</a>  Łukasz Biały, M.D., Ph.D. <a href="mailto:lukasz.bialy@wum.edu.pl">lukasz.bialy@wum.edu.pl</a>  Ewa Jankowska Steifer, Ph.D., Associate professor <a href="mailto:ewa.jankowska@wum.edu.pl">ewa.jankowska@wum.edu.pl</a>  Justyna Niderla-Bielińska, Ph.D., Associate professor <a href="mailto:justyna.niderla@wum.edu.pl">justyna.niderla@wum.edu.pl</a>  Aneta Ścieżyńska, Ph.D. <a href="mailto:aneta.sciezynska@wum.edu.pl">aneta.sciezynska@wum.edu.pl</a>  Ilona Kalaszczynska, Ph. D. <a href="mailto:ikalaszczynska@wum.edu.pl">ikalaszczynska@wum.edu.pl</a></p> <p>Department of Transplantology and Main Tissue Bank:  Artur Kamiński, M.D., Ph.D., Associate professor <a href="mailto:artur.kaminski@wum.edu.pl">artur.kaminski@wum.edu.pl</a>  Izabela Uhrynowska-Tyszkiewicz, M.D., Ph.D. <a href="mailto:iuhrynowska@wum.edu.pl">iuhrynowska@wum.edu.pl</a></p> <p>Department of Methodology:  Paweł Włodarski, M.D., D.D.S., Ph.D., Professor <a href="mailto:pawel.wlodarski@wum.edu.pl">pawel.wlodarski@wum.edu.pl</a></p>

## 2. BASIC INFORMATION

<b>Year and semester of studies</b>	2, 1 <sup>st</sup> semester	<b>Number of ECTS credits</b>	2
<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	0,25
Seminar (S)		10	0,25
Discussions (D)		25	1
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
<b>Unassisted student's work</b>			

Preparation for classes and completions	15	0,5
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<b>3. COURSE OBJECTIVES</b>	
O1	
O2	
O3	

<b>4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING</b>	
<b>Code and number of effect of learning in accordance with standards of learning</b>	<b>Effects in the field of:</b> <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>

**Knowledge – Graduate\* knows and understands:**

B.W7	physicochemical and molecular basis of the functioning of sensory organs
B.W11	structure of lipids and polysaccharides and their roles in cellular and extracellular structures;
B.W13	functions of nucleotides in the cell, the structure of I and II DNA and RNA and the structure of chromatin;
B.W14	functions of the genome, transcriptome and human proteome and the basic methods used in their study; processes of replication, repair and recombination of DNA, transcription and translation and degradation of DNA, RNA and proteins; knows the concepts of the gene expression regulation;
B.W17	ways of communication between cells, as well as between the cell and the extracellular matrix and the pathways of transmitting signals in the cell and examples of disruption of these processes leading to cancer and other diseases;
B.W18	processes, such as the cell cycle, proliferation, differentiation and aging of cells, apoptosis and necrosis, as well as their importance for the functioning of the organism;
B.W19	basic aspects associated with stem cells and their medical use;
B.W23	the mechanisms of aging of the body;
C.W4	structure of chromosomes and the molecular basis of mutagenesis;
C.W51	mechanism of hormone activity

**Skills– Graduate\* is able to:**

B.U13	plan simple research and interpret the results and draw conclusions.
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\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

<b>5. ADDITIONAL EFFECTS OF LEARNING</b>	
<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
<b>Knowledge – Graduate knows and understands:</b>	
K5	perceiving and recognizing own limitations and self-assessment of deficits and educational needs
K7	readiness to use objective sources of information
<b>Skills– Graduate is able to:</b>	
S1	
<b>Social Competencies – Graduate is ready for:</b>	
SC1	

<b>6. CLASSES</b>		
<b>Form of class</b>	<b>Class contents</b>	<b>Effects of Learning</b>
Lectures	W1 Methods of DNA analysis – from Crichton to Crick W2 Monoclonal antibodies in diagnostics and therapy W3 Cholesterol W4 DNA repair W5 RNA interference W6 Proteasomes and ubiquitin in medicine W7 Cytokines in health and disease W8 Mitochondria – not only the source of energy W9 Metaplasia and endothelial to mesenchymal transition W10 Mechanisms of inflammation	B.W7; B.W11; B.W13; B.W14; B.W17; B.W18; B.W19; B.W23; C.W4; C.W51;
Seminars (S) and Classes (C)	S1. Physiology of selected cytoplasmic processes. Physiology of cell membranes. Structure of lipids and their function In the cell and extracellular matrix. Lipids rafts. Caveolae. Asymmetry of the plasma membrane. Cellular transport. Glucose transporters. ABC transporters and MDR phenomenon. Physicochemical and molecular aspects of perception of the organ of the hearing. C1. Structure and function of cytoplasm and cell membranes Physiology of membrane enclosed compartment. Physiology of selected cytosolic processes. Ribosomes, Polysomes. Endo and exocytosis pathways. Interactions between cells and extra-cellular matrix. Cytoskeleton. S2. Cytophysiology of Cell nucleus and function. Structure of the cell nucleus. Structure of chromatin and its modifications. Tissue specific modifications of chromatin. Transcriptional activity of chromatin. RNA interference Chromosomes. Telomers. Nuclear structures involved in RNA processing. C2. Structure of nucleus. Nucleolus- structure and function. Nuclear envelope and nuclear-cytoplasmic transport. Nuclear processes before cell division. RNA interference.	B.W7; B.W11; B.W13; B.W14; B.W17; B.W18; B.W19; B.W23; C.W4; C.W51; B.U13; K5 K7

S3. Cell to cell communication.

Types of communication between cells in the human body. The answer of cells to extracellular stimuli. Molecular basis of sense perception and signal transmission in receptor cells.

C3. Cell signalling – intracellular pathways.

Receptors, second messengers (cAMP, cGMP, Ca<sup>2+</sup>, IP<sub>3</sub>, DG at al.), transcription factors (general and specific – ie. CREB, AP-1, NFκB ). Structure and function of G-proteins. Receptor and non-receptor tyrosine kinases. Kinases Src, Jak. MAP, Akt, PI3K pathways.

S4. Cell signalling events

Cell signalling by selected hormones, cytokines, growth factors and extra-cellular matrix components. Pathways activated by insulin, steroid hormones, nitric oxygen.

C4. Clinical aspect of cell signalling

Abnormalities in the cell signalling in human diseases. Cell signalling pathways as a therapeutic target.

S5. Cell proliferation.

Types of cell division; mitosis, meiosis. Cell cycle. Structure and function of mitotic spindle. Karyo- and cyto- kinesis.

C5. Regulation of the cell cycle

Cyklins i CDKinases. Role of p53, p21. pRb, Cdc25, Cdc6, APC-complex. Action of drugs interfering with cell division.

S6. Cell differentiation

Mechanism of cell differentiation. Genes involved in Cell differentiation.

Epigenetic mechanisms. Cell differentiation during embryogenesis and tissue regeneration.

C6. Stem cells.

Cell potency. Stem cells, progenitor cells. Cell differentiation of stem cells in the human body.

S7. Cell senescence and aging

Cellular senescence. Replication senescence. Cell death: apoptosis, necrosis and other types of cell death.

C7. Cell death

Apoptotic pathways. Execution of apoptosis. Caspases. Apoptosis without caspases. Physiological apoptosis. Apoptosis induction as a therapeutic target. Methods of detecting of apoptotic cells.

S8. Mechanisms of oncogenesis

Protective cellular mechanisms against cancer transformation. Abnormal gene expression in cancer. Role of p53, p21, Rb, onco mi-RNA. ATM/ATR, BRCA1/2.

C8. Cancer transformation

Malignant transformation on the example of retinoblastoma, colon cancer, breast cancer, lung cancer, chronic myeloid leukaemia.

S9. Cancer cell biology

Cancer cells properties. Abnormalities in cellular processes in cancer cells.

Abnormal cell growth. Models of cancer evolution. Cancer stem cell theory.

Tumor progression. Tumor angiogenesis. Cancer cell – extracellular matrix interactions and metastasis.

C9. Molecular cancer therapy

Cellular target of anticancer drugs incl. molecular targets of novel drugs in oncology.

S10. Regenerative medicine and tissue bio- engineering.

Cells in regenerative medicine. Stem cells – embryonic and somatic.

Differentiated cells: autologenic, izogenic (syngenic), allogenic, xenogeneic, primary and secondary. Method of stem generation: embryonic, somatic and induced stem cells. Therapeutic cloning.



	<p>C10. Cell therapy Stem cell therapy possibilities in clinical usage.</p> <p>C11. Methods of cell culture and techniques used in the medical research Methods of cell culture for medical research and regenerative medicine. The in vitro experiment on cell cultures. Types of the cell cultures. Cytostatic/cytotoxic tests in a drug discovery. Laboratory methods of cell research in medicine.</p> <p>C12. Tissue and cell banking for medical proposes. Rules of tissue and cell banking. Qualification of donors of tissues and cells. Organisation of tissue and cell banking in Poland, EU at the word. Types of transplantation. Clinical usage of transplants. Coordination 2f tissue and cell transplantation. Advanced technology medical products (ATPM) in tissue and cell banking. Types of the scaffolds and cells in tissue engineering. Transplantation in a regenerative medicine.</p>	
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<b>7. LITERATURE</b>
<b>Obligatory</b>
<ol style="list-style-type: none"> <li>1. Essential Cell Biology by. Alberts at all (ed.)</li> <li>2. Medical Cell Biology by Goodman (ed.)</li> <li>3. Rewiew: Cell and Molecular Biology Lippincott's illustrated Review by Chandar, Viselli</li> </ol>
<b>Supplementary</b>
<ol style="list-style-type: none"> <li>1. Molecular Cell Biology by Albers et all (ed.)</li> <li>2. Cell Biology by Karp</li> <li>3. The cell – a molecular approach by Cooper, Hausman</li> </ol>

<b>8. VERIFYING THE EFFECT OF LEARNING</b>		
Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
B.W7; B.W11; B.W13; B.W14; B.W17; B.W18; B.W19; B.W23; C.W4; C.W51;	Weekly test, examination	60%
B.U13; K5; K7	observation by the teacher during the classes	credit from the teacher

<b>9. ADDITIONAL INFORMATION</b>
<p><b>Regulations of classes in Cytophysiology for students of medicine:</b></p> <p><b>Organization of classes</b></p> <ol style="list-style-type: none"> <li>1. The classes begin with a seminar part where presence is obligatory.</li> <li>2. Presence on practical classes and seminars is obligatory. Delays exceeding 15 minutes will be treated as absence.</li> <li>3. Students enter the classes prepared essentially. The scope of material for classes is given in the "Program of classes".</li> <li>4. Preparation of students for classes is assessed by the teacher.</li> <li>5. During the classes, students answer questions, discuss issues covered by the subject of classes and view microscopic preparations, diagrams and electronograms.</li> </ol>

### Credit for classes – weekly tests.

1. The condition for crediting is participation in classes and seminars, passing all classes and weekly tests
2. The condition for passing the class (practical and seminar) is the presence on both parts of the class and obtaining a positive assessment of the knowledge of the material provided for the given occupation in the person conducting the practical part.
3. The days in which the dates of the classes are set are the days of obligatory classes.
4. Due to the character and organization of seminars and practical classes there is no possibility to make up for absences. **Absence at 3 or more classes, regardless of the reason, results in not getting a credit for the semester**, hence student will not be admitted to the examination.
5. **When students are absent, they are expected to negotiate with professors the form for make-up of lectures, seminars or classes missed.**
6. In order to get a credit for classes, the student must get at least 60% of the total number of points from all weekly tests.
7. If the student did not achieve 60%, she/he must get credit for all the tests for the classes for which he did not get 6 points. Not getting the minimum of 60% from all the retaken tests, results in not being admitted to the final examination.
8. All tests needs to be retaken before final examination.

### Final examination

1. The final exam takes the form of a test. Test contains 50 single choice questions and the test duration is 50 minutes. Electronic test examinations are held in the building of Main Library in the computer room.
2. The criteria for passing the exam are determined by the Head of the Department after the test, but it is assumed that at least 60% of the correct answers in the test are required.
3. **Students may evaluate their paper during the quiz. Then, if any reservations arise, students can flag the question and express their concerns. Later complaints will not be accepted.**
4. In the case of absence from the exam caused by health reasons, the student is required to provide a medical certificate within three working days of the date of the examination, under pain of entering the unsatisfactory grade.
5. In the event of failing the retake examination, at the student's request, the Dean may set a board examination.

### Position of the Chair regarding cheating during examinations

Cheating on examinations is a breach of ethics and Regulations of Studies at the Warsaw Medical University. Person actively or passively participating in cheating shall be punished by being expelled from the examination and receiving a failing mark. On the top of that, the Department shall institute disciplinary procedure against the cheating students.

Person actively participating in cheating is the one, who copies results from other students or uses illegal notes or electronic devices to communicate or store data. Bringing such devices to examinations is forbidden.

Passive participation in cheating means allowing other students copy one's own responses. Thus, a student is obliged to behave honestly, not to allow other students copy his/her own responses.

Head of the Department obliges students and examiners to strictly obey these regulations

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### ATTENTION

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## Physiology with pathophysiology elements

### 1. IMPRINT

<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical Sciences
<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>	exam
<b>Educational Unit / Educational Units</b>	Chair and Department of Experimental and Clinical Physiology (1MA) ul. Pawińskiego 3c 02-106 Warszawa e-mail: <a href="mailto:fizjologia@wum.edu.pl">fizjologia@wum.edu.pl</a>
<b>Head of Educational Unit / Heads of Educational Units</b>	Agnieszka Cudnoch-Jędrzejewska, MD, PhD, Professor
<b>Course coordinator</b>	Kaja Kasarełło, PhD, e-mail: <a href="mailto:kaja.kasarello@wum.edu.pl">kaja.kasarello@wum.edu.pl</a> Michał Kowara, MD, PhD, e-mail: <a href="mailto:michal.kowara@wum.edu.pl">michal.kowara@wum.edu.pl</a>
<b>Person responsible for syllabus</b>	Kaja Kasarełło, PhD, e-mail: <a href="mailto:kaja.kasarello@wum.edu.pl">kaja.kasarello@wum.edu.pl</a> Michał Kowara, MD, PhD, e-mail: <a href="mailto:michal.kowara@wum.edu.pl">michal.kowara@wum.edu.pl</a>
<b>Teachers</b>	Agnieszka Cudnoch-Jędrzejewska, MD, PhD, Professor; Emilian Snarski, MD, PhD, Professor; Paweł Zalewski, PhD, Professor; Kasper Buczma, MD; Katarzyna Kamińska, PhD; Kaja Kasarełło, PhD; Michał Kowara, MD, PhD; Jagoda Kruszewska, MD; Longin Niemczyk, MD, PhD; Jan Pawlonka, MD; Katarzyna Romanowska-Próchnicka, MD, PhD; Ewa Sikorska, MD; Aleksandra Stangret, PhD; Mateusz Szudzik, PhD; Małgorzata Wojciechowska, MD, PhD; Agnieszka Wsół, MD, PhD.; Anna Zalewska-Żmijewska, MD, PhD; Tymoteusz Żera, MD, PhD;

### 2. BASIC INFORMATION

<b>Year and semester of studies</b>	2nd year - 3rd and 4th semester	<b>Number of ECTS credits</b>	19.00
<b>FORMS OF CLASSES</b>	<b>Contacting hours with academic teacher</b>	<b>Number of hours</b>	<b>ECTS credits calculation</b>
Lecture (L)			
Seminar (S)		65	1
Classes (C)		90	8
e-learning (e-L)		-	-
Practical classes (PC)		-	-
Work placement (WP)		-	-
<b>Unassisted student's work</b>			
Preparation for classes and completions		280	7

<b>3. COURSE OBJECTIVES</b>	
O1	Explain physiological mechanisms by applying basic principles of physics and chemistry, describe the fundamental mechanisms underlying normal function of cells, tissues, organs, and organ systems of the human body, commensurate with the requirements for a physician providing primary care to patients.
O2	Explain the basic mechanisms of homeostasis by integrating the functions of cells, tissues, organs, and organ systems.
O3	Apply knowledge of functional mechanisms and their regulation to explain the pathophysiology underlying common diseases.

<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> (in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)
<b>Knowledge – Graduate* knows and understands:</b>	
B.W1	water-electrolytes homeostasis in biological systems
B.W2	acid-base balance, functions of buffer solutions and their role in homeostasis

B.W3	definitions of: solubility, osmotic pressure, isotonicity, colloid solutions and Gibbs-Donnan effect
B.W7	physicochemical and molecular basis of the functioning of sensory organs
B.W16	metabolic profiles of the main organs and systems
B.W20	action potential, synaptic transmission and maintenance of nerve function, striated and smooth muscles function and blood function
B.W21	regulatory mechanisms of all organs and systems in human body including: circulatory system, respiratory system, alimentary system, urinary system and skin; relationship between these mechanisms
B.W22	physiology and regulation of reproductive functions of women and men
B.W23	mechanisms of aging of the body
B.W24	main quantitative parameters describing the capacity of particular systems and organs, including scopes of the standard and demographic factors affecting values of such parameters
B.W25	relationship between factors dysregulating homeostasis and physiological as well as pathophysiological changes
C.W6	genetic conditions of human blood groups and the Rhesus incompatibility
C.W27	basic mechanisms of cell and tissue damage
C.W29	definition and pathophysiology of shock, especially the differential diagnosis of shock and multiorgan failure
C.W30	etiology of hemodynamic disorders, regressive and progressive changes
C.W32	consequences of pathological processes at certain localization in the organism to surrounding organs
C.W33	external and internal disease agents, modifiable and non-modifiable
C.W34	clinical forms of the most frequent diseases of particular systems and organs, metabolic diseases, as well as water, electrolyte and acid-base balance disturbances
C.W45	symptoms of the most common acute intoxications, including intoxication with alcohol, drugs and other psychoactive substances, heavy metals and selected groups of medicines
C.W47	influence of oxidative stress on cells and its impact on pathogenesis of diseases and in aging processes
C.W48	consequences of deficiency or excess of vitamins and minerals in human organism
C.W49	enzymes participating in digestion, mechanism of hydrochloric acid production in the stomach, the role of bile, the course of digestion products' intestinal absorption
C.W50	consequences of improper nutrition, including long-term starvation, oversized meals, unbalanced diet as well as disorders of digestion and absorption of digestion products
C.W51	mechanism of hormone activity

**Skills– Graduate\* is able to:**

B.U1	use the knowledge of the laws of physics to explain the effects of external factors such as temperature, acceleration, pressure, electromagnetic fields and ionizing radiation on the body and its components
B.U7	perform simple functional tests assessing human body as a stable regulatory system (stress tests, exercise tests) and interpret numerical data on basic physiological variables

B.U9	use simple measuring instruments and evaluate the accuracy of performed measurements
C.U11	associate the images of tissue and organ damage with the clinical symptoms of the disease, history and laboratory test results
C.U20	describe changes in the functioning of the body in the event of disturbed homeostasis, in particular define its integrated response to physical exertion, exposure to high and low temperature, loss of blood or water, sudden upright standing, transition from sleep to wakefulness

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

<b>5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)</b>	
<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
<b>Knowledge – Graduate knows and understands:</b>	
K1	Define thesis, understand the difference between law, theory and hypothesis, define strong and weak points of hypotheses.
K2	
<b>Skills– Graduate is able to:</b>	
S1	Predict physiological reactions in different situations
S2	
<b>Social Competencies – Graduate is ready for:</b>	
SC1	Perform constructive discussion about scientific theory or hypothesis
SC2	

<b>6. CLASSES</b>		
<b>Form of class</b>	<b>Class contents</b>	<b>Effects of Learning</b>
Seminar and class	<p><b>Block 1. Week 1: Cell physiology.</b>  Extracellular and intracellular fluid composition. Transport of the substances across cell membranes – functional properties of the cell membrane, diffusion, active transport of substances across membrane. Ion channels function and classification. Donnan equilibrium. Origin of the resting potential. Equilibrium potential for potassium ions. Characteristics of potassium channels responsible for the resting potential. Threshold potential. Origin of the action potential. Equilibrium potential for sodium ions. Characteristics of channels participating in different phases of the action potential. Differences between the resting and action potential in excitable cells. Channelopathies (Bartter's syndrome, Brugada disease, cystic fibrosis, long and short QT syndrome, malignant hyperthermia, migraine, myasthenia).</p>	B.W3, B.W20, B.W21 B.U1

Seminar and class	<p><b>Block 1. Week 2: Autonomic nervous system. Physiology of myocytes – smooth myocytes, skeletal myocytes, cardiomyocytes.</b></p> <p><b>Autonomic nervous system</b> General organization of the autonomic nervous system. Neurotransmitters and autonomic ganglia. Basic characteristics of sympathetic and parasympathetic function. Selective stimulation of target organs by sympathetic and parasympathetic systems or “mass discharge”. Autonomic system impact on different tissues and organs. Atropine, muscarine and phosphoroorganic compounds intoxication. Horner syndrome.</p> <p><b>Physiology of myocytes – smooth myocytes, skeletal myocytes, cardiomyocytes.</b> Physiological anatomy of skeletal muscle. Central mechanism of muscle contraction. Molecular mechanism of muscle contraction. Energetics of muscle contraction. Characteristics of the whole muscle contraction. Neuromuscular junction and transmission of impulses from nerve endings to skeletal muscle fibers. Muscle action potential. Excitation-contraction coupling. Contraction of smooth muscle. Regulation of contraction by calcium ions. Nervous and hormonal control of smooth muscle contraction. Physiology of cardiac muscle.</p>	B.W20, B.W21, B.U1, B.U7, B.U9, C.U11, C.W45
Seminar and class	<p><b>Block I. Week 3: Physiology and pathophysiology of blood.</b></p> <p>Blood composition. Blood proteins and their functions. Role of erythropoietin. Structure and functions of erythrocytes. Classification of leukocytes. Functions of platelets. Iron turnover. Hemoglobin – types and characteristics, hemoglobin dissociation curve. Oxygen and carbon dioxide transport in blood. O-A-B blood types. Rh blood types. Basic diagnostic tests – erythrocyte sedimentation rate (ESR), hematocrit, resistance of erythrocytes to hemolysis – application. Alterations in red cells system – anemias, polycythemias. Hemoglobinopathies. Alterations in white cells system – leukocytosis, leukopenia. Main serological conflicts.</p>	B.W21, B.W24, B.W25, B.U1, B.U7, B.U9, C.W6, C.W27, C.W32, C.W33, C.W34, C.W48, C.W50, C.U11, C.U20
Seminar and class	<p><b>Block I. Week 4: Physiology of cardiovascular system – part I. Cardiac muscle – the heart as a pump and the function of the heart valves. Rhythmical excitation of the heart. Cardiac output. Overview of the circulation.</b></p> <p>Cardiac cycle. Specialized excitatory and conductive system of the heart. Control of excitation and conduction in the heart. Physical characteristics of the circulation. Normal values for cardiac output at rest and during activity. Control of cardiac output by venous return – Frank-Starling mechanism of the heart. Main cardiac hemodynamics parameters – end-diastolic and end-systolic volume, stroke volume, cardiac output, ejection fraction, contraction frequency. Preload and afterload. Regulation of cardiac muscle contraction – contractility (homeometric regulation), Frank-Starling law (heterometric regulation). Influence of afterload on muscle shortening velocity (Hill’s equation). Circulation – arteries, veins, capillaries. Vascular distensibility. Arterial pressure pulsations. Veins and their function Blood flow, velocity, resistance, pressure. Flow continuity equation. Poiseuille equation. Laminar and turbulent flow.</p>	B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9,

Seminar and class	<p><b>Block I. Week 5: Physiology of cardiovascular system – part II. Nervous and humoral regulation of cardiovascular system activity. Sympathetic and parasympathetic innervation of the heart. Innervation of arteries and veins. Pre- and postsynaptic receptors and neurotransmitters.</b></p> <p>Humoral control of the tissue blood flow – vasoconstrictors, vasodilators, vascular control by ions and other chemical factors. Nervous regulation of the circulation. Special features of nervous control of arterial pressure. Renal-body fluid system for arterial pressure control. Role of the renin-angiotensin system in arterial pressure control. Summary of integrated multifaceted systems for arterial pressure regulation. Definition of the “set-point” of blood pressure. Blood pressure “set-point” changes during visceral and cutaneous pain, carotid sinus syndrome, brain hypoxia, increase of intracranial pressure (Cushing’s sign), changes in oxygen and carbon dioxide level in arterial blood. Orthostatic hypotension.</p>	B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, C.U20
Seminar and class	<p><b>Block I. Week 6: Physiology of cardiovascular system III. Principles of electrocardiography.</b></p> <p>Fundamentals of electrocardiography – waveforms of the normal electrocardiogram. Flow of the current around the heart during the cardiac cycle. Electrocardiographic leads. Vectorial analysis of the normal electrocardiogram. Mean electrical axis of the ventricular QRS and its significance. Structure and properties of heart conduction system. Sinus rhythm. Physical and electrophysiological basis of electrocardiography. Defibrillation and electrical cardioversion. Pathological ECG recordings: rhythm and conduction disturbances: respiratory sinus arrhythmia, bradycardia, tachycardia, supraventricular arrhythmias (supraventricular extrasystoles, atrial flutter, atrial fibrillation), ventricular arrhythmias (ventricular extrasystoles, ventricular tachycardia, ventricular fibrillation), atrioventricular blocks (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> degree), asystole, ischemia and electrolyte balance disturbances, pre-excitation.</p>	B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, C.W27, C.W30, C.W32, C.U11
Seminar and class	<p><b>Block I. Week 7: Physiology of cardiovascular system IV. Role of endothelium in vascular lumen regulation. Regulation of circulation in different organs. Microcirculation. Pathophysiology of the shock.</b></p> <p>Local control of blood flow in response to tissue needs. Mechanisms of blood flow control – acute control of local blood flow, long-term blood flow regulation. Control of tissue blood flow – endothelium-derived constricting and relaxing factors (nitric oxide, prostaglandins, prostacycline, thromboxane, endothelin, adenosine). Special mechanisms for acute blood flow control in specific tissues (kidney, brain, skin). Structure of the microcirculation and capillary system. Flow of blood in the capillaries – vasomotion. Exchange of water, nutrients and other substances between the blood and interstitial fluid. Interstitium and interstitial fluid. Fluid filtration across capillaries. Lymphatic system. Mechanism of edema generation: hydrostatic, oncotic, lymphatic. Blood flow regulation in skeletal muscle at rest and during exercise. Coronary circulation – physiology, physiological control, cardiac muscle metabolism. Circulatory shock and its treatment.</p>	B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, C.W27, C.W29, C.W30, C.W32, C.W33, C.W34, C.U11, C.U20
Seminar and class in center of stimulation	<p><b>Block I. Week 8: Pathophysiology of cardiovascular system.</b></p>	B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7,



	Pathophysiology in clinical cases - analysis of clinical cases of cardiovascular system pathologies.	B.U9, C.W27, C.W30, C.W32, C.W33, C.W34, C.W47, C.U11, C.U20
Seminar and class	<b>Block I. Week 9: 1<sup>st</sup> Midterm</b> – themes from the 1 <sup>st</sup> Block.	B.W3, B.W7, B.W20, B.W21, B.W24, B.W25, B.U1 B.U7, B.U9, C.W27, C.W32, C.W33, C.W34, C.W45, C.U11, C.U20
Seminar and class	<b>Block II. Week 10: Physiology and pathophysiology of urinary system.</b>  Kidney structure and vasculature. Nephron as a basic functional unit of kidney. Mechanism of primary urine formation (glomerular filtration: filtration membrane, effective filtration pressure). Creatinine clearance – methods of calculation, Cocroft-Gault formula, MDRD formula. Final urine formation (tubular transport). Renal blood flow regulation and its autoregulation. Pressure diuresis. Other causes of diuresis change. Neurogenic regulation of renal flow and tubular transport (renal innervation, reflexive regulation). Hormonal and humoral regulation of renal flow and tubular transport (renin-angiotensin-aldosterone system, vasopressin, endothelins, nitric oxide, natriuretic peptides, dopamine, adrenomedullin, cytokines). Urine concentrating and diluting mechanisms (countercurrent multiplication, countercurrent exchange, urea recycling). Calcium and phosphate balance regulation by kidney. Hormonal functions of kidney - erithropoietin, vitamin D. Role of kidney in blood pressure regulation. Pathophysiology - Polyuria, oliguria, anuria. Diabetes insipidus (central and renal form). Acute kidney failure and chronic kidney disease, proteinuria. Nephritic and nephrotic syndrome. Nephrolithiasis. Influence of uremia on the whole organism. Cystitis and urinary tract infection.	B.W1, B.W2, B.W3, B.W21, B.W24, B.W25, B.U1, B.U7, C.W27, C.W32, C.W33, C.W34, C.W45, C.U11, C.U20
Seminar and class	<b>Block II. Week 11: Physiology and pathophysiology of water, electrolyte and acid-base balance</b>  Water and electrolyte balance. Body fluid compartments – volumes and composition. Body fluids ion composition and osmolarity. Transport of osmotically active substances across biological membranes – regulation. Mechanisms regulating water and electrolytes intracorporeal translocations. Mechanisms regulating cellular volumes. Water, sodium, potassium, calcium and phosphate balance. Mechanisms regulating water and sodium balance. Dehydration and overhydration – types, mechanisms and consequences. Electrolyte balance disturbances – hiper- and hyponatremia, hyper- and hypokaliemia, hyper- and hypocalcemia, hyper- and hypomagnesemia). Acid-base balance. Volatile and non-volatile acids. Inter- and intracellular buffering systems. Role of kidney and respiratory system in pH maintenance. Acid-base balance – methods of assessment. Cerebrospinal fluid pH regulation. Primary and secondary acid-base balance disturbances: acidosis (respiratory, metabolic – causes), alkalosis (respiratory, metabolic – causes). Compensatory mechanisms in primary acid-base balance disturbances (rules of respiratory and renal compensation). Influence of acid-base balance disturbances on electrolyte balance.	B.W1, B.W2, B.W3, B.W21, B.W24, B.W25, B.U1, B.U7, C.W27, C.W32, C.W33, C.W34, C.W45, C.U11, C.U20
Seminar and class	<b>Block II. Week 12: Respiratory system – anatomical and biophysical basis of respiration.</b>  Mechanisms of pulmonary ventilation. Pulmonary volumes and capacities. Alveolar ventilation. Anatomy of the respiratory system. Structure and function of bronchial tree. Respiratory tracts	B.W16, B.W20, B.W21, B.W24, B.W25, B.U1

	<p>innervation. Structure and function of pulmonary alveolus. .  Respiratory system resistances. Surface tension. Surfactant.  Respiratory muscles work. Pulmonary leakage. Pulmonary circulation.  Pulmonary vessels walls structure. Pressure and flow resistance in pulmonary circulation. Pulmonary vessels diameter regulation, influence of oxygen pressure on pulmonary vessels smooth muscles.  Neuronal and humoral regulation of respiratory system activity.  Regulation of respiration, generation of respiratory pattern. Regulation of respiratory center; central and peripheral receptors. Airways and lungs receptors and associated reflexes – cough, yawn, reaction to toxic substances inspiration).</p>	
Seminar and class	<p><b>Block II. Week 13: Respiratory system – clinical physiology and pathophysiology.</b></p> <p>Respiratory system basic diagnostic tests (spirometry). Difference between obturation and restriction. Spirometry testing (obturation reversibility, provocation tests). Plethysmography in restrictive diseases diagnostics. Mechanism of lungs artificial ventilation. Acute and chronic respiratory failure. Pathophysiology of respiratory system inflammatory diseases (laryngitis, bronchitis, pneumonia). Pathophysiology of obstructive and restrictive diseases (bronchial asthma, COPD, emphysema, pneumoconiosis, pneumonia, viral respiratory infections – COVID-19 and others, tuberculosis). Cystis fibrosis. Pulmonary embolism (PE). Pathological respiratory patterns. Obstructive sleep apnea. Nicotinismus. Acute Mountain Sickness (AMS).</p>	<p>B.W16, B.W20, B.W21, B.W24, B.W25, B.U1, B.U7, B.U9, C.W27, C.W30, C.W32, C.W33, C.W34, C.W47, C.U11, C.U20</p>
Seminar and class in center of simulation	<p><b>Block II. Week 14: Integrative physiology - respiratory system pathophysiology, urinary system pathophysiology, acid-base balance disturbances.</b></p> <p>Pathophysiology in clinical cases - analysis of clinical cases of respiratory system pathologies, urinary system pathologies and acid-base balance disturbances</p>	<p>B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, C.W27, C.W30, C.W32, C.W33, C.W34, C.W47, C.U11, C.U20</p>
Seminar and class	<p><b>Block II. Week 15: 2<sup>nd</sup> Midterm – themes from the 2<sup>nd</sup> Block.</b></p>	<p>B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, C.W6, C.W27, C.W29, C.W30, C.W32, C.W33, C.W34, C.W47, C.U11, C.U20</p>
Seminar and class	<p><b>Block III. Week 16: Neuron physiology. Neurotransmission systems of the brain</b>  <b>Neuron physiology.</b>  Neuron and its properties. Functional and structural classification of neurons. Definitions of terms: stimulus, excitability, nerve impulse. Structure of peripheral nerves, types of nerve fibers and their characteristics. Classification of nerve fibers. Mechanism of transmission of excitation along nerve fibers. Continuous and saltatory conduction. Factors influencing the speed of impulse conduction along nerve fiber. Characteristics of dendrites and their function. Classification of electrical and chemical synapses. Mechanism of neurotransmitter release - vesicular cycle. Synaptic plasticity, factors regulating the process of synaptogenesis. Nerve regeneration.</p> <p><b>Neurotransmission systems of the brain.</b></p>	<p>B.W20, B.W21, B.U1, C.W45</p>

	<p>Acetylcholine, catecholamines, serotonin, excitatory and inhibitory amino acids. Nitrogen oxide - synthesis and inactivation. Location of neurons producing a given type of neurotransmitter. Projections of the neurotransmitters in the central nervous system. Cotransmitters. Pre- and postsynaptic receptors. Participation of neurotransmitters in the regulation of physiological processes. The influence of psychoactive substances on neurotransmission pathways.</p>	
Seminar and class	<p><b>Block III. Week 17: Physiology of the motor system - part II. Motor functions at the level of spinal cord, cortex, brainstem, basal ganglia and cerebellum.</b></p> <p>Organization of the spinal cord for motor functions. Muscle sensory receptors – muscle spindles and Golgi tendon organs and their roles in muscle control. Flexor reflex and the withdrawal reflexes. Crossed extensor reflex. Reciprocal inhibition and reciprocal innervation. Reflexes of posture and locomotion. Motor cortex and corticospinal tract. Control of motor functions by the brain stem. Vestibular sensation and the maintenance of equilibrium. The cerebellum and its motor functions. The basal ganglia and their motor functions. Integration of the many parts of the total motor control system.</p>	B.W20, B.W21, B.U1, B.U7, B.U9
Seminar and class	<p><b>Block III. Week 18: Pathophysiology of the motor system</b></p> <p>Pre- and postsynaptic disturbances of neuromuscular junction (myasthenia gravis, Lamber-Eaton syndrome, botulism). Myopathies. Channelopathies of striates muscles. Multiple sclerosis. Pyramid tracts lesion. Pathophysiology of selected extrapyramidal system diseases: Parkinson’s disease, Huntington’s disease, hemiballismus, essential tremor, cerebellar ataxia. Decerebration. Pathological nystagmus. Motion sickness.</p>	B.W20, B.W21, B.U1, B.U7, B.U9, C.W27, C.W32, C.W33, C.W34,
Seminar and class	<p><b>Block III. Week 19: Physiology and pathophysiology of sensory system. Physiological and pathological pain.</b></p> <p>Types of sensory receptors and the stimuli they detect. Transmission of sensory stimuli into nerve impulses. Signal intensity transmission in nerve tracts – spatial and temporal summation. Classification of somatic senses. Detection and transmission of tactile sensations. Sensory pathways for transmitting somatic signals into the central nervous system. Transmission in the dorsal column-medial lemniscal system. Transmission of sensory signals in the anterolateral pathway. Somatosensory cortex lesions. Lesions of sensory integration, autism and Asperger syndrome</p> <p>Fast pain and slow pain and their qualities. Pain receptors and their stimulation. Dual pathways for transmission of signals into central nervous system. Pain suppression (analgesia) system in the brain and in the spinal cord. Referred pain. Visceral pain. Thermal sensations. Practical issues - pathological pain, principles of pain treatment: analgetic ladder, opioids in treatment of acute and chronic pain.</p>	B.W20, B.W21, B.W25, B.U1
Seminar and class	<p><b>Block III. Week 20: Physiology and pathophysiology of sensory system. Vision, hearing, taste and smell.</b></p> <p>Physical principles of optics. Optics of the eye. Fluid system of the eye – intraocular fluid.</p>	B. W7, B.U1, B.U9

	<p>Anatomy and function of the structural elements of the retina. Photochemistry of vision. Color vision. Eye adaptation to light and darkness. Visual field (stereoscopic vision). Neural function of the retina.</p> <p>Visual pathways. Organization and function of the visual cortex. eye movements and their control. Autonomic control of accommodation and pupillary aperture.</p> <p>Eye refractive errors – nearsightedness (myopia), farsightedness (hyperopia), astigmatism. Strabismus. Cataracts. Glaucoma. Retinal Detachment. Night blindness. Color blindness.</p> <p>Tympanic membrane and the ossicular system. Cochlea. Corti’s organ. Endolymph and perilymph. Mechanism of acoustic waves conversion into electric impulses. Central auditory mechanisms. Vestibular sensation and the maintenance of equilibrium . Basis of laryngological examination – hearing tests. Conductive and sensorineural hearing loss. Hearing aids and cochlear implants.</p> <p>Sense of taste. Sense of smell.</p>	
Seminar and class	<p><b>Block III. Week 21: Cerebral cortex, intellectual functions of the brain, learning and memory. Limbic system. Behavior. Sleep. Basis of the bioelectric activity of brain (EEG). Pathophysiology – sleep disturbances, amnesia, dementia, mood disturbances, psychosis.</b></p> <p>Characteristics of limbic system. Function of prefrontal cortex. Congenital behavior: unconditional reflex, instinct, imprinting, impulse. Adaptive behavior (classical and instrumental conditioning). Reward system. Definition of learning and memory. Division and types of memory. Anatomy of memory. Long-term potentiation and long-term depression.. Retrograde and anterograde amnesia. Results of prefrontal cortex, hippocampus and surrounding temporal lobes damage. Results of amygdala damage. Amnesic syndromes (Alzheimer’s disease, vascular dementia, Lewy body dementia). Sleep.. Role of reticular system in regulation of sleep and wake. Examination of cerebral bioelectric activity by electroencephalography (EEG). Stages of sleep in human. Characteristics and physiological meaning of REM and NREM sleep. Biological rhythms disturbances – jet lag. Sleep deprivation, narcolepsy, somnambulism. EEG record abnormalities. Epilepsy and its types.</p>	B.W20, B.W24, B.W25, B.U9, C.W32, C.W33, C.W34, C.U11, C.U20
Seminar and class	<p><b>Block III. Week 22: 3<sup>rd</sup> Midterm – themes from the 3<sup>rd</sup> Block.</b></p>	B.W3, B.W7, B.W20, B.W21, B.W24, B.W25, B.U1 B.U7, B.U9, C.W27, C.W32, C.W33, C.W34, C.W45, C.U11, C.U20
Seminar and class	<p><b>Block IV. Week 23: Physiology and pathophysiology of gastrointestinal system</b></p> <p>Neurohormonal regulation of food intake. Autonomic intestinal system. Gastrointestinal and biliary system motility. Secretory function of digestive glands – saliva excretion, gastric, pancreatic and intestinal secretion). Interaction between endocrine and exocrine pancreatic secretion. Structure and function of liver. Digestion and absorption (water, electrolytes, vitamins, minerals, carbohydrates, proteins, fats). Hepatic circulation – anatomic and functional peculiarities. Disturbances of gastrointestinal motility function (vomiting, diarrhea, constipation, achalasia, GERD, peptic ulcers). Gastric and duodenal ulcer disease. Pathophysiology of liver, gall bladder and biliary ducts</p>	B.W21, B.W24, B.W25, B.U7, C.W27, C.W32, C.W33, C.W34, C.W48, C.W49, C.W50, C.U11

	(jaundice, viral hepatic diseases, acute liver failure, liver cirrhosis and portal hypertension, cholecystitis, autoimmune liver disease, Wilson's disease, non-alcoholic fatty liver disease)). Pathophysiology of pancreas (acute and chronic pancreatitis). Intestinal inflammation – Lesniowski-Crohn's disease, ulcerative colitis) – Disturbances of digestion and absorption (celiac disease, pernicious anemia). Gastrointestinal neoplastic diseases.	
Seminar and class	<p><b>Block IV. Week 24: Endocrine system part I. Hypothalamic-pituitary-thyroid axis, Hypothalamic-pituitary-suprarenal axis – physiology and pathophysiology. Hypothalamic and pituitary hormones.</b></p> <p>Hypothalamic-pituitary-thyroid axis. TRH and TSH – activity and regulation of secretion. Thyroid hormones regulatory function. Interaction between thyroid and other hormones. Hypothalamic-pituitary-suprarenal axis. CRH and ACTH – activity and regulation of secretion. Mineralocorticoids and glucocorticoids – regulatory function. Hyperprolactinemia. Cushing's syndrome and Cushing's disease. Conn's syndrome. Hyperthyroidism and hypothyroidism. Suprarenal cortex and medulla disturbances.</p>	B .W21, B.W24, B.W25, B.U7, C.W27, C.W32, C.W34, C.W51, C.U11
Seminar and class	<p><b>Block IV. Week 25: Endocrine system part II. Pancreatic endocrine function. Endocrine regulation of growth and metabolism. Stress phenomenon.</b></p> <p>Endocrine regulation of growth and metabolism. Growth hormone – regulation of secretion and mechanism of action. Specificity and selectivity of individual growth factors activity in organs and tissues. Gigantism, acromegaly, pituitary dwarfism. Pancreas as endocrine organ (glucagon and insulin). Type 1 and type 2 diabetes mellitus. Hypoglycemia. Islet cells tumors (insulinoma, gastrinoma). Theories of stress. Adaptative function of stress. Stress hormones (hypothalamic-pituitary-suprarenal axis, ADH). Brain neurotransmission systems alterations and sympathetic system excitement during stress. Human organism's reaction to acute and chronic stress. Stress influence on cardiovascular and psychiatric disorders development. PTSD.</p>	B.W16, B.W21, B.W24, B.W25, B.U7, C.W27, C.W32, C.W34, C.W51, C.U11
Seminar and class	<p><b>Block IV. Week 26: Physiology and pathophysiology of reproductive system, pregnancy and birth. Lactation.</b></p> <p>Endocrine regulation of reproductive function. Sex hormones in men and women – mechanism of action and regulation of secretion. Menstrual cycle (hormone levels alterations, endometrial alterations, vaginal mucosal alterations). Maturation and puberty. Menopause. Andropause. Klinefelter Syndrome, Turner Syndrome, true hermaphroditism, pseudohermaphroditism, hypogonadism, hyperprolactinemia, endometriosis. Fertilization and zygote implantation. Uterine-fetal unit (exchange between mother and fetus, hormones of uterine-fetal unit). Development of the fetus. Alterations in pregnant woman's organism (hormonal, metabolic, cardiovascular, respiratory, genitourinary, gastrointestinal and nervous system). Birth. Lactation. Female and male infertility. Miscarriage risk factors. Gestational diabetes and hypertension. Ectopic pregnancy, Fetal Alcoholic Syndrome (FAS), Fetal hypotrophy. Prematurity – causes and long-term consequences.</p>	B.W21, B.W22, B.W23, B.W24, B.W25, B.U7, C.W33, C.W51, C.U11

Seminar and class	<p><b>Block IV. Week 27: Resting and exercise energy expenditure. Thermoregulation. Obesity. Metabolic disturbances.</b></p> <p>Central regulation of hunger and satiety. Fat tissue as a source and target of hormones. Basic and rest metabolism. Energetic balance of the organism. Rules of proper nutrition. Metabolic disorders. Obesity and malnutrition. Heat production and exchange with environment. Heat balance. Internal and skin temperature. Internal temperature alterations – tolerance limits. Thermoregulation system – mechanism of action central and peripheral thermoreceptors, cerebral thermoregulation center. Role of cutaneous circulation in thermoregulation. Regulation of perspiration. Human organism reaction to heat and cold. Acclimatization to cold and hot temperatures. Hypothermia. Hyperthermia (heat shock – mechanism, diagnosis). Malignant hyperthermia. Fever.</p>	B.W20, B.W21, B.W24, B.W25, B.U9, C.W33, C.W34, C.W50, C.W51, C.U11, C.U20.W20, B.W21, B.W24, B.W25, B.U9, C.W33, C.W34, C.W50, C.W51, C.U11, C.U20
Seminar and class	<p><b>Block IV. Week 28: Physiology of physical exercise.</b></p> <p>Male and female athletes. Muscles in exercise – strength, power, endurance of muscles, muscles metabolic systems. Nutrients used during muscles activity. Effects of athletic training on muscles and muscle performance. Cardiovascular system in exercise. Body heat in exercise. Body fluids and salt in exercise. Drugs and athletes. Body fitness benefits.</p>	B.W1, B.W2, B.W16, B.W20, B.W21, B.W23, B.W24, B.W25, B.U7, B.U9, C.W27, C.W30, C.W33, C.U11, C.U20
Seminar and class	<p><b>Block IV. Week 29: 4<sup>th</sup> Midterm – themes from the 4<sup>th</sup> Block.</b></p>	B.W1, B.W2, B.W3, B.W16, B.W20, B.W21, B.W22, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, C.W27, C.W30, C.W32, C.W33, C.W34, C.W45, C.W48, C.W49, C.W50, C.W51, C.U11, C.U20
Seminar and class	<p><b>Summary seminar – final seminar for the entire course. Retakes.</b></p>	B.W1, B.W2, B.W3, B.W16, B.W20, B.W21, B.W22, B.W23, B.W24, B.W25, B.U1, B.U7, B.U9, CW.27, C.W30, C.W32, C.W33, C.W34, C.W45, C.W48, C.W49, C.W50, C.W51, C.U11, C.U20
Lecture	<b>Inauguration lecture</b>	
Lecture	<b>Hemostasis. Hemostatic disorders</b>	B.W21, B.W25, C.W27, C.W33, C.W34
Lecture	<b>Hematologic disorders</b>	B.W25, C.W6, C.W34
Lecture	<b>Short- and long-term regulation of blood pressure. Arterial hypertension.</b>	B.W1, B.W20, B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34
Lecture	<b>Pulmonary circulation. Deep vein thrombosis and pulmonary embolism. Pulmonary hypertension.</b>	B.W21, B.W25, C.W27, C.W33, C.W34
Lecture	<b>Electrocardiography</b>	B.W20, B.W25, C.W32, C.W45
Lecture	<b>The conducting system of the heart. Mechanisms of cardiac arrhythmia. The examples of the most common arrhythmia.</b>	B.W1, B.W20, B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34
Lecture	<b>Pathophysiology of the most common heart diseases</b>	B.W21, B.W25, C.W29, C.W30, C.W32, C.W33, C.W34

Lecture	<b>Coronary artery disease. Myocardial infarction.</b>	B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34
Lecture	<b>Pathophysiology of acute and chronic heart failure.</b>	B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34
Lecture	<b>The pathophysiology of the most common respiratory system diseases. Basic diagnostic tests. Mechanical ventilation.</b>	B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34
Lecture	<b>Pathophysiology of urinary tract diseases. Basic diagnostic tests.</b>	B.W1, B.W2, B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34
Lecture	<b>Brain neuroplasticity. Developmental disorders of plasticity.</b>	B.W20, B.W21, B.W25, C.W27, C.W32, C.W34
Lecture	<b>Behaviour. Limbic system. Prefrontal cortex. Neurobiology of speech.</b>	B.W20, B.W21, B.W25, C.W27, C.W32, C.W34
Lecture	<b>Neurodegenerative diseases.</b>	B.W20, B.W21, B.W25, C.W27, C.W32, C.W34
Lecture	<b>Consciousness and awareness. Disturbances of consciousness.</b>	B.W20, B.W21, B.W25, C.W27, C.W32, C.W34
Lecture	<b>Neurodegeneration in ophthalmic diseases. Clinical aspects.</b>	B.W.7, B.W.24, C.W.22, C.W.33, C.W.34
Lecture	<b>Pathophysiology of the most common diseases of the digestive system.</b>	B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34, C.W49
Lecture	<b>Hormonal regulation of metabolism. Regulation of calcium homeostasis. Hormonal regulation of growth. Pathophysiology of the endocrine system.</b>	B.W16, B.W21, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34, C.W51
Lecture	<b>Physiology and pathophysiology of pregnancy.</b>	B.W21, B.W22, B.W24, B.W25, C.W30, C.W32, C.W33, C.W34, C.W51
Lecture	<b>Mechanisms of human adaptation to extreme conditions.</b>	B.W1, B.W2, B.W21, B.W25, C.U20
Lecture	<b>Physiology of ageing. Civilization diseases.</b>	B.W23, B.W24, C.W47

## 7. LITERATURE

### Obligatory

John E. Hall. Guyton and Hall Textbook of Medical Physiology, 14th Edition , 2021, Elsevier

### Supplementary

Rodney A. Rhoades, David R. Bell : Medical physiology : principles for clinical medicine — 2013, 4th ed. Wolter's Kluwer

Gary D. Hammer, MD, PhD, Stephen J. McPhee, MD, Pathophysiology of Disease: An Introduction to Clinical Medicine, 2014, 7e, McGraw Hill.

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
B.W1,2,3,7,16,20,21-25 B.U1,7,9 C.W6,20,27,29,30,32-34,45,47-51 C.U11,20	Seminars and classes – Students need to actively participate in the seminars and classes, which is assessed by the assistant who perform the seminar or class. <b>In every week</b> , the “ <b>Weekly Set</b> ”, which is a MCQ with <b>5 questions</b> on e-learning platform needs to be completed. There will be 2 trials for each “Weekly Set”. <b>Student should take all the Weekly Sets. If A Weekly Set is not taken the vote from this Weekly Set is 0 point.</b> <b>The summary vote is calculated before every Midterm MCQ Test, from the Weekly Sets in all didactic weeks from the certain Block</b> (i.e. e.g. summary vote to the 2 <sup>nd</sup> Midterm MCQ is calculated from the MCQs only from weeks 9 <sup>th</sup> -14 <sup>th</sup> ).	Weekly Sets – the MCQs after the seminars – student needs to obtain average vote 3/5 or higher (from all the Weekly Sets) to be qualified for the Midterm MCQ Test. If average vote is lower than 3/5 the additional qualification to the Midterm MCQ is needed.
B.U1,7,9 B.W1-3, 7,16,2-25,33 C.U11,20 C.W22,27,29,30,32-34,45,47-51	<b>4 Midterm MCQ Tests</b> after completion of each <b>Block</b> – test with 20 MCQ. Retake if the Midterm MCQ is failed – test with 10 MCQ If the retake is failed – 2 <sup>nd</sup> retake (Commission Midterm Retake) - oral examination directly by the assistant responsible for the didactic, during summary seminar, at the end of the academic year, before the session.	12/20 (60%) points to pass Retake – 6/10 points to pass 2 <sup>nd</sup> retake – completion confirmed by the lecturer
B.U1,7,9 B.W1-3, 7,16,2-25,33 C.U11,20 C.W22,27,29,30,32-34,45,47-51	Final exam – test with 100 MCQ Includes topics from lectures, seminars and classes.	60% of points to pass

## 9. ADDITIONAL INFORMATION

### COURSE SITE:

Lectures: on site or e-learning – information will be given on e-learning platform and the website.

### Seminars:

- Monday Group 2 - 16.40-18.20 - Classroom A4.05 & A4.06, Pawińskiego 3a (CSM)
- Monday Group 3 - 15.00-16.40 – Classroom A4.05 & A4.06, Pawińskiego 3a (CSM)
- Tuesday Group 1 - 16.40-18.20 - Classroom A4.05 & A4.06, Pawińskiego 3a (CSM)
- Tuesday Group 4 - 15:00-16:40 - Classroom A4.05 & A4.06, Pawińskiego 3a (CSM)

### Practical classes

- Group 2 Friday 09:00-11:30 dept. Classroom, Medical Simulation Center
- Group 3 Friday 11:30-14:00 dept. Classroom, Medical Simulation Center
- Group 4 Friday 14:15-16.45 dept. Classroom, Medical Simulation Center
- Group 1 Friday 16:45-19:15 dept. Classroom, Medical Simulation Center

### PRESENCES/ABSENCES

The presence on the lectures, seminars and classes is compulsory. **During the entire course 3 absences (either on seminar or on class – class and seminar are treated separately) are permissible . Any additional absence requires formal justification. All the absences (even those permissible) must be made up in the form announced by course coordinator.**

### WEEKLY SETS

- In every week the “Weekly Set” – a MCQ (5 questions, 1 point for each question) on e-learning platform needs to be completed. There will be 2 trials for the Weekly Set.

- Importantly – the required knowledge to pass the MCQ covers the entire material arranged for the certain week (not only material from the seminars).

- If the Weekly Set doesn't be prepared on e-learning platform the Students will be informed and the MCQ will be organized on Classes (on Friday).

### MIDTERM MCQ TEST



- Each Block is summarized with **Midterm MCQ Test** with 20 questions. Scoring 60% is necessary to pass.

**FINAL EXAM**

Final exam – 100 MCQs

- 60% of points needs to be gained in order to pass the exam and obtain grade 3 (satisfactory). The scoring for the higher grades will be created after the exam, according to the Gaussian curve.
- In case of the failure in the Final Exam – the organization, form and complete criterion for the retake will be issued by the Chair and Department of Experimental and Clinical Physiology.

**SCIENTIFIC CLUB**

**information on the Department website.**

It will be an opportunity for activity in the Scientific Club – the students are invited for the qualification to Scientific Club after the Final Exam.

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**ATTENTION**

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## IMMUNOLOGY

<b>1. IMPRINT</b>	
<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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>	<b>Exam</b>
<b>Educational Unit / Educational Units</b>	<p><b>Department of Clinical Immunology (1MG)</b>            Nowogrodzka 59 St, 02-006 Warsaw            Tel.: (+48 22) 502 14 72, 502 12 60            Faks: (+48 22) 502 21 59            E-mail:            Secretary: Ewa Rusinowicz &lt;ewa.rusinowicz(at)uckwum.pl&gt;,            Head: Dr hab. Radosław Zagożdżon &lt;radoslaw.zagozdzon(at)wum.edu.pl&gt;            Didactic coordinator: Dr hab. Beata Kaleta &lt;beata.kaleta(at)wum.edu.pl&gt;  <a href="https://zik.wum.edu.pl/">https://zik.wum.edu.pl/</a></p>
<b>Head of Educational Unit / Heads of Educational Units</b>	Professor Leszek Pączek, MD PhD

<b>Course coordinator</b>	Dr hab. n. med. i n. o zdr. Beata Kaleta e-mail: <a href="mailto:beata.kaleta@wum.edu.pl">beata.kaleta@wum.edu.pl</a>
<b>Person responsible for syllabus</b>	Dr hab. Beata Kaleta <beata.kaleta(at)wum.edu.pl>
<b>Teachers</b>	Dr hab. n. med. Radosław Zagożdżon Dr hab. n. med. i n. o zdr. Beata Kaleta Dr hab. n. med. i n. o zdr. Anna Burdzińska Dr hab. n. med. Jan Borysowski Dr n. med. Monika Kniotek Lek. Emilia Kniotek

## 2. BASIC INFORMATION

<b>Year and semester of studies</b>	II year, 4 semester	<b>Number of ECTS credits</b>	3.00
<b>FORMS OF CLASSES</b>		<b>Number of hours</b>	<b>ECTS credits calculation</b>
<b>Contacting hours with academic teacher</b>			
Lecture (L)		0	
Seminar (S)		40	3
Discussions (D)		0	
e-learning (e-L)		0	
Practical classes (PC)		0	
Work placement (WP)		0	
<b>Unassisted student's work</b>			
Preparation for classes and completions		0	0

## 3. COURSE OBJECTIVES

O1	Familiarization with basic immunology in reference to elements of clinical immunology
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**4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING** (*concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study*)

<b>Code and number of effect of learning in accordance with standards of learning</b>	<b>Effects in the field of:</b> ( <i>in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019</i> )
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**Knowledge – Graduate\* knows and understands:**

G.K1	The graduate knows and understands basics of development and mechanisms of immune system activity, including specific and non-specific mechanisms of humoral and cellular immunity (C.W21)
G.K2	The graduate knows and understands major histocompatibility complex (C.W.22)
G.K3	The graduate knows and understands types of hypersensitivity reactions, types of immunodeficiency and basics of immunomodulation (C.W23)
G.K4	The graduate knows and understands issues in the field of tumor immunology (C.W24)
G.K5	The graduate knows and understands causes, symptoms, principles of diagnosis and therapeutic management in relation to the most common internal diseases occurring in adults and their complications: 8) allergic diseases, including anaphylaxis, anaphylactic shock and angioedema (E.W7 p. 8)

**Skills– Graduate\* is able to:**

G.S1	The graduate is able to use the antigen-antibody reaction in current modifications and techniques for the diagnosis of infectious, allergic, autoimmune and neoplastic diseases and blood diseases (C.U8)
G.S2	The graduate is able to associate the f tissue and organ damage with clinical signs, history and results of laboratory tests (C.U11)

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

**5. ADDITIONAL EFFECTS OF LEARNING** (*non-compulsory*)

<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
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**Knowledge – Graduate knows and understands:**

K1	-
K2	-

**Skills– Graduate is able to:**

S1	-
S2	-

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

SC1	-
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SC2	-
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## 6. CLASSES

Form of class	Class contents	Effects of Learning
Seminars	S1- Introduction to the immune system S2 - Cells and tissues of the immune system S3 - Circulation and migration of leukocytes S4 – Innate immunity and natural killer cells S5 – Recognition of antigens by antibodies S6 – Presentation of antigens to T lymphocytes by major histocompatibility complex molecules S7 – Cytokines and signaling via immune receptors S8 – Development of lymphocytes and antigen receptor gene rearrangement S9 - Activation of T lymphocytes S10 – Differentiation and functions of effector T Cells S11 – Activation of B lymphocytes and antibody production S12 – Effector mechanisms of humoral immunity S13 – Specialized immunity at epithelial barriers and immune privileged tissues S14 - Immunity to Microbes S15 – Hypersensitivity disorders and allergy S16 – Immunologic tolerance and autoimmunity S17 – Immunity to tumors S18 – Transplantation immunology S19 – Acquired immunodeficiencies S20 – Congenital immunodeficiencies	C.W21 C.W22 C.W23 C.W24 C.U8 C.U11 E.W7 8)

## 7. LITERATURE

<b>Obligatory</b>
„Cellular and Molecular Immunology” (10 <sup>th</sup> edition) (Cellular and Molecular Immunology, Abul K. Abbas & Andrew H. Lichtman & Shiv Pillai)
<b>Supplementary</b>
Riots Essential Immunology” (13th edition) by Peter J. Delves, Seamus J. Martin, Dennis R. Burton, Ivan M Riott

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
G.K1-G.K5  G.S1-G.S2	Exam – single choice test (50 questions) Correction exam - single choice test (50 questions)	CRITERIA: <ul style="list-style-type: none"> <li>• 2.0 (failed): 0-25 (out of 50) positive answers on</li> <li>• 3.0 (satisfactory): 26 – 29 (out of 50) positive answers on MCQ</li> </ul>

	Commission exam – oral exam (3-5 descriptive questions)	<ul style="list-style-type: none"> <li>• 3.5 (rather good): 30–33 (out of 50) positive answers on MCQ</li> <li>• 4.0 (good): 34 – 37 (out of 50) positive answers on MCQ</li> <li>• 4.5 (more than good): 38 – 42 (out of 50) positive answers on MCQ</li> <li>• 5.0 (very good): 43 – 50 (out of 50) positive answers on MCQ</li> </ul>
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**9. ADDITIONAL INFORMATION** (*information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club*)

**Attendance at all seminars is mandatory** and will be verified by checking the attendance list. In exceptional situations, a student who was absent from a seminar on a given topic and **is on sick leave** for that time must pass the seminar orally or in writing to his/her assistant.

In case of any absences which were not passed student will **not be admitted to the exam**.

Seminars take place in the Lindleya campus.

All actual information about classes can be found on the website of the Department: <https://zik.wum.edu.pl/en>

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**ATTENTION**

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## Polish for medicine

### 1. IMPRINT

<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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>	Foreign Language Department The Didactic Center, ul. Trojdena 2a, 02-109 Warsaw <a href="mailto:sjosekretariat@wum.edu.pl">sjosekretariat@wum.edu.pl</a> , tel. 22 5720863 <a href="http://www.sjo.wum.edu.pl/">www.sjo.wum.edu.pl/</a>
<b>Head of Educational Unit / Heads of Educational Units</b>	Maciej Ganczar, PhD, Professor at MUW e-mail: <a href="mailto:maciej.ganczar@wum.edu.pl">maciej.ganczar@wum.edu.pl</a>
<b>Course coordinator</b>	Anna Maczkowska, MA e-mail: <a href="mailto:anna.maczkowska@wum.edu.pl">anna.maczkowska@wum.edu.pl</a>
<b>Person responsible for syllabus</b>	Anna Maczkowska, MA e-mail: <a href="mailto:anna.maczkowska@wum.edu.pl">anna.maczkowska@wum.edu.pl</a>
<b>Teachers</b>	Maciej Ganczar, PhD Anna Maczkowska, MA

### 2. BASIC INFORMATION

<b>Year and semester of studies</b>	2 <sup>nd</sup> , 1 <sup>st</sup> and 2 <sup>nd</sup> semester	<b>Number of ECTS credits</b>	5.00
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FORMS OF CLASSES	Number of hours	ECTS credits calculation
<b>Contacting hours with academic teacher</b>		
Lecture (L)		
Seminar (S)		
Classes (C)	60	3
e-learning (e-L)		
Practical classes (PC)		
Work placement (WP)		
<b>Unassisted student's work</b>		
Preparation for classes and completions	160	2

<b>3. COURSE OBJECTIVES</b>	
O1	The 2 <sup>nd</sup> year Polish language course is designed to improve the students' command of the language and provide them with basic medical terminology and skills to communicate with an adult and paediatric patient at elementary level.

<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> <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>
<b>Knowledge – Graduate* knows and understands:</b>	
D.W6	the importance of verbal and non-verbal communication in the process of communicating with the patient and the concept of trust in interaction with the patient.
<b>Skills– Graduate* is able to:</b>	
D.U18	communicate with the patient in one of the foreign languages at B2+ level of the Common European Framework of Reference for Languages

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

<b>5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)</b>



<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
<b>Knowledge – Graduate knows and understands:</b>	
K1	names of basic symptoms, ailments, medical specialties and parts of hospital and hospital staff in Polish
<b>Skills– Graduate is able to:</b>	
S1	take a patient's history at elementary Polish language level (personal history; chief complaint (pain): location, radiation, quality, quantity, duration, frequency, aggravating and relieving factors, associated symptoms; past history; family history; drug history; social history; the review of systems)
S2	give simple instructions to an adult and paediatric patient during a physical examination and explain the doctor's intentions
<b>Social Competencies – Graduate is ready for:</b>	
SC1	continually broadening their knowledge

<b>6. CLASSES</b>		
<b>Form of class</b>	<b>Class contents</b>	<b>Effects of Learning</b>
C1/2	Discussing the syllabus (the course content, learning outcomes and the methods of their verification; rules and regulations; credit receiving criteria). Everyday activities – verbs. Revision of Past and Present tense • The <i>trzeba/można</i> + infinitive construction • Revision of genitive, accusative and nominative cases; introduction of locative case and the verb “opiekować się”	D.U18 K1 S1, S2, S3 SC1
C 3/4	Parts of the human body • The verb <i>boleć</i> (singular&plural/present&past tense) Organs of the human body • The cases of the noun and adjective in the singular&plural genitive, accusative, locative, instrumental and nominative – forms and uses	D.W6, D.U18 K1 S1, S2, S3 SC1
C 5/6	•Time expressions (revision) • Revision of the tenses (present&past). Distinction between imperfective & perfective verbs • Questions: <i>jak długo?, jak często?, ile razy?, od jak dawna?, O której godzinie?</i>	D.W6, D.U18 K1 S1, S2, S3 SC1
C 7/8	• Dative case – forms and usage • Hospital stay (case description) – vocabulary. Useful phrases ( <i>wezwać pogotowie, przyjąć do szpitala</i> )	D.W6, D.U18 K1 S1, S2, S3, SC1
C 9/10	• Hospital departments and staff • Giving directions	D.W6, D.U18 K1 S1, S2, S3, SC1
C 11/12	• Medical specialties and specialists • Revision of genitive and locative cases ( <i>do kardiologa, na oddziale, w szpitalu</i> ) • names of organ systems	D.W6, D.U18 K1 S1, S2, S3, SC1
C 13/14	• types of medications • The verb <i>brać/wziąć</i> (singular/present&past tense) • basic ailments ( <i>katar, kaszel, dreszcze</i> ) • revision of 1 <sup>st</sup> term vocabulary	D.W6, D.U18 K1 S1, S2, S3, SC1

C 15	Intermediate test	D.U18 K1 S1, S2, S3, SC1
C 16/17	Instructions for the clinical examination of adults • Explaining the doctor's intentions to the patient	D.W6, D.U18 K1 S1, S2, S3, SC1
C18/19	Instructions for the clinical examination of children • Explaining the doctor's intentions to the patient • The imperative mood	D.W6, D.U18 K1 S1, S2, S3, SC1
C20/21	The common cold and flu – a patient's description of the symptoms in the present/past tense • usage of formal register ( <i>pan/pani</i> ) • question formation • taking history – basic rules	D.W6, D.U18 K1 S1, S2, S3, SC1
C22/23	Pain history – location, radiation, onset (timing, setting), previous similar pain, duration, character, severity, exacerbating and relieving factors, associated symptoms (vocabulary). • Common diseases • The verbs <i>chorować (na)</i> , <i>leczyć się (na)</i> (present&past tense), <i>umrzeć (na)</i> (past tense)	D.W6, D.U18 K1 S1, S2, S3, SC1
C24/25	The medical interview: personal history (name, age, occupation, height, weight, marital/family status) social history – alcohol, smoking	D.W6, D.U18 K1 S1, S2, S3, SC1
C26	The medical interview: chief complaint • past history – surgeries, injuries, hospital admissions, previous illnesses, birth control, pregnancies / births, menstrual periods, allergies	D.W6, D.U18 K1 S1, S2, S3, SC1
C27/28	The medical interview: systemic inquiry (basic questions) Revision	D.W6, D.U18 K1 S1, S2, S3, SC1
C29	Final test – written part	D.U18 K1 S1, S2, S3, SC1
C30	Final test – oral part	D.W6, D.U18 K1 S1, S2, S3, SC1

## 7. LITERATURE

### Obligatory

Maciej Ganczar, Anna Maczkowska "Jak się pani dzisiaj czuje?" Podręcznik do nauki medycznego języka polskiego jako obcego

### Supplementary

Handouts prepared by the teachers.

Maria Janowska, Świetlana Sikorska "Proszę oddychać! Część III Warszawski Uniwersytet Medyczny

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
D.W6, D.U18 K1	Written test. Oral test.	To successfully complete the 2nd year Polish language course and obtain credit, a student is required to:

S1, S2, S3, SC1

- attend all classes (min. 13 out of 15 in a semester)  
A student who misses more than 2 classes per semester without a valid excuse will not be allowed to take the course tests and will not receive course credits.  
The only valid excuse for absence is illness. Absences due to illness will be excused on presentation of a valid medical note within one week of return to study.  
The student is obliged to make up for each absence (excused or unexcused) by performing a special written/oral task assigned by the teacher OR by attending a class with another group (on teacher's permission). If a student misses a class, she/he must catch up on the missed material. It is the student's responsibility to communicate with the class teacher as soon as possible about any attendance issues.
- come to classes punctually  
If a student arrives less than 15 minutes late three times per semester, it will count as one absence. Arriving to class more than 15 minutes late is counted as an absence.
- actively participate in each class
- complete all the assignments by the due date
- pass the progress test at the end of the winter semester and the course written and oral tests (covering the coursework of both the winter and summer semesters) at the end of the summer semester

A student who fails the course tests can attempt two retakes.  
The final course grade a student receives is the average (arithmetic mean) of the written and oral test grades (grades of 2-5), or a grade of 3 for passing a retake. A minimum score of 60% must be obtained on each (written and oral) test to pass the course.

A student who misses a scheduled test will receive a score of 0 (which equals failing) unless she/he notifies the class teacher of the reason for her/his failure to take the test within three days of the scheduled test date and makes up the missed test if the reason is justified at the date set by the class teacher.

A student who fails the second retake of the final test needs to repeat the course.

Students who are 'independent users' of the Polish language (Level B2 as described in the Common European Framework) may be exempted from attending the second year Polish language course (and the second year Polish language course provided they achieve the required score) if they pass the B2 level examination organised by the University's Centre for Foreign Languages (Studium Języków Obcych) at the beginning of the academic year. Students interested in taking the exam should check with their class teacher for the exam date, time and location at the first class meeting.

The scale of grades is as follows:

2.0 (failed)	Below 60%
3.0 (satisfactory)	60-69%
3.5 (rather good)	70-79%
4.0 (good)	80-85%
4.5 (more than good)	86-90%

		5.0 (very good)	91-100%
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## 9. ADDITIONAL INFORMATION

All detailed information about the course completion criteria and rules are listed in the Rules and Regulations of the Centre for Foreign Languages <https://sjo.wum.edu.pl/node/449>

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### ATTENTION

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## Medical Ethics with Elements of Philosophy

### 1. IMPRINT

<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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>	credit
<b>Educational Unit</b>	Department of Medical Ethics and Palliative Medicine (2MC), Litewska St. 14/16, 02-672 Warsaw, Poland; e-mail: <a href="mailto:zaklad-bioetyki@wum.edu.pl">zaklad-bioetyki@wum.edu.pl</a> , tel. 48 22 116 9234

<b>Head of Educational Unit</b>	Prof. dr hab. Tomasz Pasierski
<b>Course coordinator</b>	dr Agata Łukomska e-mail: <a href="mailto:agata.lukomska@uw.edu.pl">agata.lukomska@uw.edu.pl</a>
<b>Person responsible for syllabus</b>	dr Agata Łukomska e-mail: <a href="mailto:agata.lukomska@uw.edu.pl">agata.lukomska@uw.edu.pl</a>
<b>Teachers</b>	dr Agata Łukomska, Prof. Joanna Górnicka-Kalinowska, Natalia Szejko MD PhD (lecture)

## 2. BASIC INFORMATION

<b>Year and semester of studies</b>	II year, 3 semester	<b>Number of ECTS credits</b>	2.00
<b>FORMS OF CLASSES</b>		<b>Number of hours</b>	<b>ECTS credits calculation</b>
<b>Contacting hours with academic teacher</b>			
Lecture (L)		20	0,96
Seminar (S)		10	0,44
Classes (C)			
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
<b>Unassisted student's work</b>			
Preparation for classes and completions		12	0,6

## 3. COURSE OBJECTIVES

O1	To acquaint the student with the philosophical basis of scientific medical knowledge
O2	To acquaint the student with the basics of physician ethics.
O3	To develop the basic skills necessary for independent analysis of ethical problems in medicine

**4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING** (*concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study*)

<b>Code and number of effect of learning in accordance with standards of learning</b>	<b>Effects in the field of:</b> ( <i>in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019</i> )
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**Knowledge – Graduate\* knows and understands:**

G.K1	the functioning of health care systems and the physician’s social role; D.W8
G.K2	the main concepts, theories and ethical principles which provide the framework for correct interpretation and analysis of moral-medical questions; DW16
G. K3	patient rights; D.W17
G.K4	the foundations of evidence based medicine; D.W23

**Skills– Graduate\* is able to:**

G.S1	inform the patient on the aims, process and possible risk of the proposed diagnostic and therapeutic interventions and obtain the patient’s informed consent; D.U6
G.S2	observe the ethical requirements in professional activities; D.U13
G. S3	recognize the ethical dimension of medical decisions and discern the facts from norms; D.U14
G.S4	respect patient rights; D.U15

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

**5. ADDITIONAL EFFECTS OF LEARNING** (*non-compulsory*)

<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
-------------------------------------	----------------------------------

**Knowledge – Graduate knows and understands:**

K1	
K2	

**Skills– Graduate is able to:**

S1	
S2	

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

SC1	
SC2	

<b>6. CLASSES</b>		
<b>Form of class</b>	<b>Class contents</b>	<b>Effects of Learning</b>
L1 - lecture	Philosophy and its main subdisciplines. Knowledge and types of science. Inductive inference. Humanities. Basics of philosophy of science. Theories of truth.	G.K4
L2 - lecture	Philosophical and methodological foundations of EBM. Ethics and medical professionalism	G.K4
L3 - lecture	Philosophical ethical theories.	G.K2, G.S3
L4 - lecture	Ethical regulation in medicine. Justice in healthcare and patient's rights.	G.K2, G.K3, G.S3
L5 - lecture	Physician-patient relationship and informed consent. Patient's decisional competency	GK.1, GK.2
L6 - lecture	Physician's professional autonomy. Medical paternalism. Truthfulness and confidentiality.	G.K1 G.K2, G.K3
S1 - seminar	Medical professionalism	G.K1, G.S2
S2 - seminar	Informed consent to medical services. Patient's autonomy and decisional competency.	GK.2, G.K3, GS.1, G.S2, G.S3, G.S4
S3 - seminar	Physician's professional autonomy. Medical confidentiality.	G.K1, G.K2, G.K3, G.S1, G.S2, G.S3, G.S4
S4 - seminar	Patient's privacy. Ethics of the beginnings of life.	G.K2, G.K3, G.S1, G.S2, G.S3, G.S4
S5 - seminar	Conflict of interest in healthcare.	G.K1, G.K2, G.K3, G.S2, G.S3, G.S4
S6 - seminar	Ethical problems in pediatrics. The ethics of the end of life issues.	G.K2, G.K3, G.S1, G.S2, G.S3, G.S4

<b>7. LITERATURE</b>
<b>Obligatory</b>
T. L. Beauchamp, J. F. Childress, Principles of Biomedical Ethics, Oxford University Press 1994 (fourth edition), chap. 3-7.
<b>Supplementary</b>
Scholarly journal articles selected for particular seminars. List of readings will be provided during first seminar.



**8. VERIFYING THE EFFECT OF LEARNING**

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
<i>e.g. G.K1, G.S1, K1</i>	<i>This field defines the methods used for grading students e.g. pop quiz, test, written report etc.</i>	<i>e.g. threshold number of points</i>
G.K1-G.K6	Multiple choice test.	60% correct answers
G.S1-G.S6	Correct analysis of a medical ethical case during class presentation.	Acquisition of the skill at an acceptable level.

**9. ADDITIONAL INFORMATION** (*information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club*)

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**ATTENTION**

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## GENETICS - BASIC

<b>1. IMPRINT</b>	
<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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>	Credit
<b>Educational Unit / Educational Units</b>	Department of Medical Genetics Center for Biostructure Research, First Faculty of Medicine ul. Pawińskiego 3c, 02-106 Warszawa phone: +48 22 572 06 95, fax: +48 22 572 06 96 <a href="http://www.genetyka.wum.edu.pl">http://www.genetyka.wum.edu.pl</a> e-mail: <a href="mailto:krzysztof.szczaluba@wum.edu.pl">krzysztof.szczaluba@wum.edu.pl</a>

<b>Head of Educational Unit / Heads of Educational Units</b>	Head of the Department: Rafał Płoski MD PhD
<b>Course coordinator</b>	Krzysztof Szczaluba MD PhD e-mail: <a href="mailto:krzysztof.szczaluba@wum.edu.pl">krzysztof.szczaluba@wum.edu.pl</a> tel. 22 572 06 95
<b>Person responsible for syllabus</b>	Krzysztof Szczaluba MD PhD e-mail: <a href="mailto:krzysztof.szczaluba@wum.edu.pl">krzysztof.szczaluba@wum.edu.pl</a> tel. 22 572 06 95
<b>Teachers</b>	Rafał Płoski MD PhD Joanna Kosińska PhD Agnieszka Pollak PhD Małgorzata Rydzanicz PhD Anna Walczak PhD Piotr Gasperowicz MSc Karolina Rutkowska MSc

<b>2. BASIC INFORMATION</b>			
<b>Year and semester of studies</b>	2nd Year and 4th Semester	<b>Number of ECTS credits</b>	2.00
<b>FORMS OF CLASSES</b>		<b>Number of hours</b>	<b>ECTS credits calculation</b>
<b>Contacting hours with academic teacher</b>			
Lecture (L)		-	-
Seminar (S)		8	0.55
Classes (C)		17 (live, contact classes:17)	1.12
e-learning (e-L)		-	-
Practical classes (PC)		-	-
Work placement (WP)		-	-
<b>Unassisted student's work</b>			
Preparation for classes and completions		5	0.33

<b>3. COURSE OBJECTIVES</b>	
O1	The aim of the course is to present theoretical and laboratory basics of medical and clinical genetics. In the course, the main focus is on teaching how to make use of the obtained knowledge in practice.

O2	Students will also learn to interpret basic genetic analysis, understand principles of genetics counselling and will be acquainted with basic laboratory and statistical methods used in the research in the field of human genetics.
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**4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING** (*concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study*)

<b>Code and number of effect of learning in accordance with standards of learning</b>	<b>Effects in the field of:</b> ( <i>in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019</i> )
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**Knowledge – Graduate\* knows and understands:**

B.W13 B.W14	functions of nucleotides in the cell, the structure of I and II DNA and RNA and the structure of chromatin functions of the genome, transcriptome and human proteome and the basic methods used in their study; processes of replication, repair and recombination of DNA, transcription and translation and degradation of DNA
C.W1 C.W2 C.W4	basic terms in the field of genetics phenomena of genes linkage and interactions the structure of chromosomes and molecular basis of mutagenesis
C.W5 C.W6 C.W8	the principles of inheritance different number of traits, inheritance of quantitative traits, independent inheritance of traits and inheritance of extranuclear genetic information. genetic conditions of human blood groups and the Rhesus incompatibility factors which influence the primary and secondary genetic balance of population

**Skills– Graduate\* is able to:**

C.U1 C.U4 C.U5	analyse genetic crosses and pedigrees of human traits and diseases and estimate the risk of giving birth to a child with chromosomal aberrations conduct morphometric measurements, analyse morphograms and record disease karyotypes assess the risk of giving birth to an affected child based on family predispositions and influence of environmental factors
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\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

**5. ADDITIONAL EFFECTS OF LEARNING** (*non-compulsory*)

<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
-------------------------------------	----------------------------------

**Knowledge – Graduate knows and understands:**

K1	Student is able to work in a group in order to solve a problem from the field of genetics.
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<b>6. CLASSES</b>		
Form of class	Class contents	Effects of Learning

Seminars & Practice	<p>1. Basics of genetic medical history and pedigree analysis. Modes of inheritance in human. Genomic imprinting. Drawing pedigrees based on clinical cases. Analysis of modes of inheritance</p> <p>2. Calculating genetic risk in multifactorial diseases. Applicability of RR and OR in medical genetics. Calculating reoccurrence risk in monogenic diseases. Empirical estimation of disease likelihood in a family using Bayes theory</p> <p>3. Usefulness of LR calculation in medical genetics. Calculating likelihood of pedigrees</p> <p>4. De novo mutations. Calculating genetic risk considering mutagenesis</p> <p>5. Genes identification and mapping. Linkage analysis</p> <p>6. Introduction to cytogenetic testing. Chromosomal basis of human diseases. Methods in molecular cytogenetics. Analysis of cytogenetic results. Using online databases in CGH analysis.</p> <p>7. Personalized medicine – whole-genome sequencing of DNA. Analysis of DNA sequencing results.</p>	<p>BW13 B.W14 C.W1 C.W2 C.W4 C.W5 C.W6 C.W8 C.U1 C.U4 C.U5</p>
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<b>7. LITERATURE</b>		
<b>Obligatory</b>		
<p>Medical Genetics Jorde, Carey, Bamshad 4th Edition Elsevier</p>		
<b>Supplementary</b>		
-		
<b>8. VERIFYING THE EFFECT OF LEARNING</b>		
<b>Code of the course effect of learning</b>	<b>Ways of verifying the effect of learning</b>	<b>Completion criterion</b>
e.g. G.K1, G.S1, K1	<i>This field defines the methods used for grading students e.g. pop quiz, test, written report etc.</i>	<i>e.g. threshold number of points</i>
C.U1, C.U4, C.U5, K1	Report from completed task	Solving correctly a given task (drawing a pedigree based on clinical description of a family; interpreting a result of a genetic testing; calculating genetic risk; defining a term; explaining a biological process)
B.W13, B.W14 C.W1 C.W2 C.W4 C.W5 C.W6 C.W8 C.U1 C.U4	Credit (test)	Answering correctly to more than 50% of questions

**9. ADDITIONAL INFORMATION** (*information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club*)

**Students are obliged to attend all seminars and classes. No absence is accepted during classes and seminars. Each absence on classes and seminars would have to be covered with another group. Change of groups is possible only as an exchange with a person from another group. Being late for over 15 minutes counts as an absence.**

**Person responsible for students affairs: Krzysztof Szczaluba MD PhD krzysztof.szczaluba@wum.edu.pl**

**Evaluation criteria**

**Form of passing the course:** *passing without a grade*

Pass	Criteria
<b>Not passed</b>	Getting 50% of points or less
<b>Passed</b>	Getting more than 50% of points

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**ATTENTION**

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## Medical Communication

<b>1. IMPRINT</b>	
<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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>Studium Psychologii Zdrowia [Department of Health Psychology (DHP)] - practicals ul. Litewska 14/16, 00-575 Warszawa, Tel. +48 22 116 92 11</p> <p>Studium Komunikacji Medycznej [Department of Medical Communication (DMC)] – e-learning lectures ul. Litewska 14/16, 00-575 Warszawa, Tel. +48 22 116 92 270</p>
<b>Head of Educational Unit / Heads of Educational Units</b>	<p>DHP: Professor Dorota Włodarczyk, MA, PhD</p> <p>DMC: Antonina Doroszevska, MA, PhD</p>
<b>Course coordinator</b>	<p>Magdalena Łazarewicz, MA, PhD magdalena.lazarewicz@wum.edu.pl</p>
<b>Person responsible for syllabus</b>	<p>Magdalena Łazarewicz, MA, PhD magdalena.lazarewicz@wum.edu.pl</p>
<b>Teachers</b>	<p>Practicals:</p> <p>Magdalena Łazarewicz, MA, PhD (magdalena.lazarewicz@wum.edu.pl) Elżbieta Łazarewicz-Wyrzykowska, MA, PhD (ela.lazarewicz.wyrzykowska@gmail.com) Marcin John, MA (marcin.john@gmail.com)</p> <p>E-learning lecture:</p> <p>Adrianna Beczek, MD (adrianna.beczek@wum.edu.pl) Antonina Doroszevska, PhD (antonina.doroszevska@wum.edu.pl)</p>

<b>2. BASIC INFORMATION</b>			
<b>Year and semester of studies</b>	II year, 2 <sup>nd</sup> semester	<b>Number of ECTS credits</b>	1.00
<b>FORMS OF CLASSES</b>	<b>Contacting hours with academic teacher</b>	<b>Number of hours</b>	<b>ECTS credits calculation</b>
Lecture (L)			
Seminar (S)			
Discussions (D)	10	0.4	
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
<b>Unassisted student's work</b>			
Preparation for classes and completions	5	0.2	

<b>3. COURSE OBJECTIVES</b>	
O1	During the course student acquires knowledge and skills on the basic psychological aspects of the medical interviewing, becomes familiar with the Calgary Cambridge model of communication and is able to apply its' selected elements.
O2	The student understands why good communication skills are important in medical practice and knows how to develop good rapport with patients and their families; is aware of different models of doctor-patient interactions and understands their consequences for medical outcomes.
O3	The student gains basic knowledge and skills in verbal and nonverbal communication.
O4	The student understands and applies principles of effective interpersonal communication in medical context: uses various techniques of active listening: open- and closed ended questions, facilitation, checking, clarification, summarising.
O5	The student understands what empathy is and how to express it, is able to reflect and legitimate emotions, elicit patient's concerns, ideas and expectations; know how to provide emotional support.

<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> <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>
<b>Knowledge – Graduate* knows and understands:</b>	
D.W5	the rules and methods of communication with the patient and his family, which are used to build an empathic, trust-based relationship



D.W6	the role of good verbal and nonverbal communication in doctor-patient interaction, the meaning of trust in the interaction with patients
D.W15	the principles of motivating the patient to promote healthy behaviour and informing about unfavourable prognosis

**Skills– Graduate\* is able to:**

D.U1	include patient’s subjective needs and expectations resulting from socio-cultural background in the entire therapeutic process
D.U4	builds the atmosphere of trust during the treatment process
D.U5	conduct the consult with the patient with the use of empathy and active listening; is able to discuss patient’s life situation
D.U11	applies basic psychological motivational and supportive interventions

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

**5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)**

<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
-------------------------------------	----------------------------------

**Knowledge – Graduate knows and understands:**

K1	
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**Skills– Graduate is able to:**

S1	
----	--

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

SC1	
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**6. CLASSES**

Form of class	Class contents	Effects of Learning
e-L	Functions of medical communication. Communication and patient satisfaction. The role of empathy in doctor-patient relationship. Methods of communication. Communication barriers and errors. Medical interview. Breaking bad news. Communication in medical team. Difficult conversations with patients. Motivational interviewing.	D.W5 D.W6 D.W15
C1	Basic skills in medical communication (1) – the importance of communication for medical outcomes; basic rules of building a good doctor-patient/family relationship: verbal and nonverbal aspects of communication; showing respect and building rapport; eliciting patient’s perspective; active listening skills in gathering information; questioning techniques	D.W5 D.W6 D.U1 D.U4
C2	Basic skills in medical communication (2) – educating and explaining in medical practice; including patient’s perspective in the treatment process, discussing treatment with patients	D.U1 D.U4 D.U5

C3	Empathy and support - responding to patient's expectations and needs with empathy, eliciting and validating emotional state of patients during treatment process, giving emotional support to patients,	D.U1 D.U4 D.U5 D.U11
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## 7. LITERATURE

### Obligatory

PDF materials provided by the teacher during the course; materials provided withing the e-learning

### Supplementary

Silverman, J., Kurtz, S, Draper J (2008) Skills for Communicating with Patients. Radcliffe Publishing.

Lloyd, M., Bor R., Noble, L. (2019) Clinical Communication Skills for Medicine. Elsevier.

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
D.W5, D.W6, D.U1, D.U4, D.U5, D.U11	Active participation in all exercises during classes	Minimal acceptable level of performance
D.W5, D.W6, D.W15	Completing the e-learning course and submitting the written exercise required in the e-learning course	Minimal acceptable level of performance

## 9. ADDITIONAL INFORMATION

The e-learning lectures are held on MUW e-learning platform.

The classes are in person, practical and based on experiential learning. The outcomes of that process are strongly related to active participation in all in-class activities and attendance is mandatory. Students will be allowed to make up missed work in case of an excused absence. In such cases students should notify the teacher as soon as possible to establish the way of covering the absence. Change of subgroups is possible only after consulting the teacher in advance.

Students are expected to come to the class on time and participate actively. Being late for over 15 minutes counts as an absence. Recurring tardiness will result in additional work – an essay or short review of literature (based on the decision of the teacher, depending on the missed material). To provide good learning environment for everyone, students are requested to turn off any electronic devices that might disturb the class.

To complete the course students are required to be present at all classes (with a possibility to come with another group in case of absence – after teachers approval), participate actively in all exercises, complete the e-learning course and submit the written exercise required in the e-learning course.

Contact information to the course coordinator:

Magdalena Łazarewicz, MA, PhD  
[magdalena.lazarewicz@wum.edu.pl](mailto:magdalena.lazarewicz@wum.edu.pl)

The Department of Health Psychology runs the Psychological Students Science Club "Psyche" (in English) (contact information: [magdalena.lazarewicz@wum.edu.pl](mailto:magdalena.lazarewicz@wum.edu.pl)).

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### ATTENTION

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## Hygiene and Epidemiology

### 1. IMPRINT

<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<b>Study Profile</b>	general academic
<b>Level of studies</b>	uniform MSc
<b>Form of studies</b>	Full-time program
<b>Type of module / course</b>	obligatory
<b>Form of verification of learning outcomes</b>	completion
<b>Educational Unit / Educational Units</b>	Department of Social Medicine and Public Health Medical University of Warsaw Oczki 3, 02-007 Warszawa Phone: 22-621-52-56, 22-621-51-97 E-mail: msizp@wum.edu.pl
<b>Head of Educational Unit / Heads of Educational Units</b>	Professor Aneta Nitsch-Osuch, MD, PhD (anitsch@wum.edu.pl)
<b>Course coordinator</b>	Anna Jagielska, MD, PhD – anna.jagielska@wum.edu.pl
<b>Person responsible for syllabus</b>	Anna Jagielska, MD, PhD – anna.jagielska@wum.edu.pl
<b>Teachers</b>	Prof. Aneta Nitsch-Osuch, MD, PhD – <a href="mailto:msizp@wum.edu.pl">msizp@wum.edu.pl</a> Irena Kosińska, MSc, PhD – <a href="mailto:irena.kosinska@wum.edu.pl">irena.kosinska@wum.edu.pl</a> Anna Jagielska, MD, PhD – <a href="mailto:anna.jagielska@wum.edu.pl">anna.jagielska@wum.edu.pl</a> Katarzyna Okręglicka, MSc, PhD – <a href="mailto:katarzyna.okreglicka@wum.edu.pl">katarzyna.okreglicka@wum.edu.pl</a> Aleksandra Kozłowska, MSc, PhD – <a href="mailto:aleksandra.kozlowska@wum.edu.pl">aleksandra.kozlowska@wum.edu.pl</a>

<b>2. BASIC INFORMATION</b>			
<b>Year and semester of studies</b>	2 <sup>nd</sup> year, 1 <sup>st</sup> and 2 <sup>nd</sup> semester	<b>Number of ECTS credits</b>	2.00
<b>FORMS OF CLASSES</b>	<b>Contacting hours with academic teacher</b>	<b>Number of hours</b>	<b>ECTS credits calculation</b>
Lecture (L)			
Seminar (S)		10	0,66
Discussions (D)		20	1,00
e-learning (e-L)		-	-
Practical classes (PC)		-	-
Work placement (WP)		-	-
<b>Unassisted student's work</b>			
Preparation for classes and completions		10	0,34

<b>3. COURSE OBJECTIVES</b>	
O1	Presentation of the history, basic definitions and tasks of hygiene, epidemiology and health promotion
O2	Teaching about a healthy lifestyle: proper nutrition, proper physical activity, avoidance of addictions, healthy environment and others
O3	Teaching the principles to motivate patients to ch health-promoting behaviors
O4	Teaching the principles of prevention of infectious diseases and chronic non-communicable diseases
O5	Providing knowledge on epidemiological methods for assessing population health and disease risk factors

<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> <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>
<b>Knowledge – Graduate* knows and understands:</b>	

G.K1.	methods for assessing the health status of individuals and populations, different classification systems of diseases or medical procedures
G.K2.	methods for identifying and investigating risk factors, the advantages and disadvantages of different types of epidemiological studies and the measures for the presence of a cause-effect relationship
G.K3.	the epidemiology of infectious and chronic diseases, the prevention possibilities in the different phases of the natural history of the disease and the role of epidemiological surveillance
D.W14.	the principles of health promotion, its tasks and its main lines of action, with particular attention to the role of the elements of healthy lifestyle

**Skills– Graduate\* is able to:**

G.S1.	describe the demographic structure of the population and, on this basis, assess the population's health problems
G.S2.	collect information on the presence of risk factors for infectious and chronic diseases and plan preventive measures at different levels of prevention
G.S3.	interpret the incidence of diseases and disabilities
G.S4.	assess the epidemiological situation of common diseases in the Republic of Poland and worldwide
G.S8.	work in such a way as to prevent medical errors
B.U9.	operate simple measuring devices and evaluate the accuracy of the measurements carried out

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

**5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)**

<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>
-------------------------------------	----------------------------------

**Knowledge – Graduate knows and understands:**

K1	
----	--

**Skills– Graduate is able to:**

S1	
----	--

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

SC1	to become aware of one's own limitations and to acquire the ability to continuously train oneself
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**6. CLASSES**

Form of class	Class contents	Effects of Learning
S1	History of hygiene and epidemiology. Basic concepts and definitions	G.K2, G.K3, G.S1
S2	Modern tasks of health promotion with special attention to the role of the elements of a healthy lifestyle	D.K14, G.S3, SC1
S3	Epidemiological surveillance	G.K3, G.S2, CS1

S4	Current situation of noncommunicable diseases in Poland and in the world.	G.K3, G.S1
S5	Health and the environment. Implementation of the health promotion at a workplace.	G.K2, G.S3, CS1
S6	Current situation of noncommunicable diseases in Poland and in the world. New and re-emerging infectious diseases.	G.K3, G.K3, G.S1
S7	The prevention of noncommunicable diseases	G.K1, G.K3, G.S1, CS1
S8	Types of epidemiological studies. Environmental epidemiology. Case – control and cohort studies. Clinical trial.	G.K2, G.K3
S9	Hand hygiene as a fundamental method for preventing hospital infections and ensuring the safety of patients and medical staff. Hospital hygiene.	G.S3, G.S8, CS1
C1	Healthy lifestyle in everyday practice of medical doctors.	D.W14, G.S8, B.U9
C2	Methods to motivate patients to a healthy lifestyle	D.W14, CS1
C3	Identification of individual and environmental risk factors	G.K1, G.S2, G.S8
C4	Prophylaxis for the treatment of early stages of non-communicable diseases.	G.K1, G.S1, G.S8
C5	Methods for assessing the health status of individuals and populations Death charts.	G.K1, G.S2
C6	Classifications of diseases and medical procedures. International Classification of Diseases and Health Problems.	G.K1, G.S3, G.S8
C7	Epidemiology in practice: study planning, interpretation of results, use of statistical methods, interpretation of results. Screening tests.	G.K2, G.S2
C8	Methods for the prevention of infectious diseases at the population level. Anti-vaccine movements. Reporting of vaccine adverse effect (VAE) in every day medical practice.	G.K1, G.K2, G.K3, G.S3, G.S1, G.S8
C9	Reporting of an infectious disease and an alarm pathogen. Develop the outbreak of an infectious disease. Evaluation of the epidemiological situation of diseases widespread in the Republic of Poland and worldwide	G.K1, G.K3, G.S3, G.S2, G.S4, G.S8
C10	Hand hygiene – practical exercises	G.S2, G.S8, B.U9
C11	Air quality and health.	D.K14, B.U9

## 7. LITERATURE

### Obligatory

1. Friedman G.D. Primer of Epidemiology. McGraw-Hill, New York (available in the Institute)
2. Jędrychowski W, Muger U. Epidemiologic methods in studying chronic diseases. International Center for Studies & research in Biomedicine, Luxembourg 2000.
3. Gerald van Belle, Lloyd D. Fisher, Patrick J. hearty, Thomas S. Lumley. Biostatistics: A methodology for health sciences. 2nd Edition, August 2004.
4. Ahrens W., Pigeot I. Hanbook of Epidemiology. Springer-Verlag, Berlin, Heilderberg 2005 (selected chapters)
5. Shills ME et al. Modern nutrition in health and disease, LWW 2010
6. Gibney MJ et al. Introduction to Human Nutrition, Wiley-Blackwell 2009
7. Escott – Stump S, Nutrition and Diagnosis-related care, LWW 2007
8. Rom WN, Environmental and occupational medicine, LWW 2006
9. Levy BS, Occupational and environmental health, LWW 2005

10.	www.who.org
11.	Polish Journal of Nutrition
12.	American Journal of Preventive Medicine
<b>Supplementary</b>	

<b>8. VERIFYING THE EFFECT OF LEARNING</b>		
<b>Code of the course effect of learning</b>	<b>Ways of verifying the effect of learning</b>	<b>Completion criterion</b>
<i>e.g. G.K1, G.S1, K1</i>	<i>This field defines the methods used for grading students e.g. pop quiz, test, written report etc.</i>	<i>e.g. threshold number of points</i>
G.W1, G.W2, G.W3, D.W14, G.U1, G.U2, G.U3, G.U4, G.U8, B.U9, K.S1	Participation in e-learning course (both obligatory and additional parts). Solving quizzes and test. Obtaining a certificate.  Attendance at all seminar classes. Active participation in the seminars.  Passing the practical tasks during the classes. Positive evaluation of the acquired skills and competences obtained from the teacher - exercise report. Preparation and presentation of a given topic related to health promotion.  The final written test, including the content of seminars and exercises.	100% attendance  Credit - completion of the task in at least 61%.  Single-choice test  To pass a student needs to score at least >61% correct answers Assessment Criteria 2. 0 (failed) < 61% of points. 3. 0 (satisfactory) 61-75% 3. 5 (satisfactory +) 76-80% 4. 0 (good) 81-86% 4,5 (good +) 87-90% 5. 0 (very good) >90%

<b>9. ADDITIONAL INFORMATION</b>
<ol style="list-style-type: none"> <li>In the implementation of the course it is important to attend seminars and classes, as they present the latest scientific developments.</li> <li>Person responsible for conducting the didactics: Anna Jagielska, MD, PhD, <a href="mailto:anna.jagielska@wum.edu.pl">anna.jagielska@wum.edu.pl</a></li> <li>Absences (excused) can be made up with another group by prior arrangement with the person in charge of teaching.</li> <li>Conditions of conducting the exercises: punctuality, during the exercises it is forbidden to use mobile phones or recording meetings.</li> <li>The Department of Social Medicine and Public Health is affiliated with 1) Student Scientific Association of Hygiene and Prevention. Supervisor of SSA - Dr Irena Kosińska, e-mail: <a href="mailto:irena.kosinska@wum.edu.pl">irena.kosinska@wum.edu.pl</a> (environmental topics) and 2) Students Scientific Association of Healthcare Management (contact to a scientific supervisor Dr Magdalena Bogdan: <a href="mailto:mbogdan@wum.edu.pl">mbogdan@wum.edu.pl</a>). Information about the SSA is available on the Department's website.</li> <li>The up-to-date information about the Department's activities and announcements about didactics might be found at our website <a href="https://msizp.wum.edu.pl">https://msizp.wum.edu.pl</a></li> </ol>

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**ATTENTION**  
 The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.



## Research Methodology

<b>1. IMPRINT</b>	
<b>Academic Year</b>	2024/2025
<b>Department</b>	Faculty of Medicine
<b>Field of study</b>	Medicine
<b>Main scientific discipline</b>	Medical sciences
<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><b>Department of Methodology (1MN)</b>            Center for Preclinical Research, 1b Banacha Street, 3rd floor, room B06            e-mail: metodologia@wum.edu.pl, www.metodologia.wum.edu.pl</p> <p><b>Department of Health Economics and Medical Law</b>            Żwirki Wigury 81 Street, ZIAM building room no 5, tel. : 22 57-20-702 , e-mail:  <a href="mailto:zep@wum.edu.pl">zep@wum.edu.pl</a> www.zep.wum.edu.pl/</p>



<b>Head of Educational Unit / Heads of Educational Units</b>	Assoc. Prof. Piotr Dziechciarz MD,PhD ( <a href="mailto:piotr.dziechciarz@wum.edu.pl">piotr.dziechciarz@wum.edu.pl</a> )
<b>Course coordinator</b>	Wiktor Paskal, MD, PhD, <a href="mailto:metodologia@wum.edu.pl">metodologia@wum.edu.pl</a>
<b>Person responsible for syllabus</b>	Wiktor Paskal, MD, PhD, <a href="mailto:metodologia@wum.edu.pl">metodologia@wum.edu.pl</a>
<b>Teachers</b>	Department of Methodology of Scientific Research Prof. Paweł Włodarski MD, PhD Wiktor Paskal, MD, PhD Kacper Pełka MD, Dawid Mehlich MD, Klaudia Klicka MD, Michał Kopka MD, Albert Stachura MD, Department of Health Economics and Medical Law Prof. Aleksandra Czerw, PhD

<b>2. BASIC INFORMATION</b>			
<b>Year and semester of studies</b>	II year, III and IV semester	<b>Number of ECTS credits</b>	1
<b>FORMS OF CLASSES</b>		<b>Number of hours</b>	<b>ECTS credits calculation</b>
<b>Contacting hours with academic teacher</b>			
Lecture (L)		5 (5 in e-learning)	0.1
Seminar (S)		15 (15 in e-learning)	0.3
Discussions (D)		15	0.5
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
<b>Unassisted student's work</b>			
Preparation for classes and completions		10	0,1

<b>3. COURSE OBJECTIVES</b>	
O1	To acquire the knowledge and skills necessary to conduct scientific research in accordance with Good Laboratory Practice (GLP) and Good Clinical Practice (GCP) standards.
O2	To systematize evidence-based knowledge (Evidence Based Medicine, EBM) necessary in daily medical practice.
O3	Introduction to sources of scientific data, ways of obtaining them and critical analysis. The phenomenon of pseudoscience.
O4	Gain the ability to plan and execute a simple scientific project and prepare the results for publication in scientific journals and presentation at conferences.
O5	Formation of correct ethical attitudes in scientific research.

<b>4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING (concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study)</b>	
<b>Code and number of effect of learning in accordance with standards of learning</b>	<b>Effects in the field of:</b> <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>

**Knowledge – Graduate\* knows and understands:**

G.W8	knows the regulations on medical experimentation and other medical research
BW29	knows the principles of scientific, observational and experimental research and in vitro studies for the development of medicine

**Skills– Graduate\* is able to:**

B.U11	choose an appropriate statistical test, perform basic statistical analyses and use appropriate methods to present results; interpret results of meta-analysis and perform survival probability analysis
B.U12	explains the differences between prospective and retrospective, randomised and case-control studies, case reports and experimental studies and ranks them according to the reliability and quality of scientific evidence
B.U13	plans and carries out a simple scientific investigation and interprets its results and draws conclusions
C.U11	recognizes own limitations, makes self-assessment of deficits and educational needs, plans own educational activity
D.U16	demonstrate responsibility for improving their own skills and passing on knowledge to others
D.U17	critically analyses medical literature, including English, and draws conclusions based on the available literature

\* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

<b>5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)</b>	
<b>Number of effect of learning</b>	<b>Effects in the fields of:</b>

<b>6. CLASSES</b>		
<b>Form of class</b>	<b>Class contents</b>	<b>Effects of Learning</b>

Lectures	<p><b>L1 - Creative scientific and research activities - conditions, requirements and legal protection.</b>            Conducting legal research in medicine and the biological sciences. Legally permissible animal, clinical, biomedical research. Protection of patients' personal data. Limits and legal conditions of creativity in medical and biological sciences. Copyright and industrial property rights.            Lecture in the form of synchronous e-learning</p>	G.W8, D.U16
	<p><b>L2 - Science, not fiction. Means several words about manipulations in science.</b>            Unreliability and falsification in science. Manipulations in research design and interpretation. Problems of "predatory journals". Using scientific research in marketing and advertisement. Issues of pseudoscience.            Lecture in the form of asynchronous e-learning</p>	G.W8, B.W29, D.U16
Seminars	<p><b>S1 - Ethics in scientific research.</b>            Knowledge of regulations regarding the ethics of conducting animal and human research. Protection of sensitive data. The guidelines of the Declaration of Helsinki for the conduct of human research. Informed consent for research. Preparing an application to the bioethics committee. Animal research - EU and IACUC guidelines, principles of animal research design, legislation and preparation of applications to the Animal Ethics Committee.            Seminar in the form of asynchronous e-learning</p>	G.W8, C.U11, D.U16
	<p><b>S2 - Fundamentals of EBM.</b>            Learning the principles of EBM, clinical research design. Types of scientific research. Research design - formulating a research question.            Seminar in the form of asynchronous e-learning.</p>	B.W29, B.U11, B.U12, D.U16
	<p><b>S3 - Data types, basic statistics for research</b>            Identify the type of data obtained from research studies. Use and significance of PPV, NPV, OR, HR, CI95%. Determination of the minimum group size in the planned study.            Seminar in the form of asynchronous e-learning.</p>	B.U11, B.U12, B.U13, D.U16
	<p><b>S4 - Medical databases.</b>            Effective use of medical databases to answer a scientific or clinical question. Basics of use and features of selected services for scientists and physicians.            Seminar in the form of asynchronous e-learning</p>	D.U17, C.U11
	<p><b>S5 -Clinical trials</b>            Design, organization, methodology, phases of clinical trials. Interpretation of results including the most frequent errors. Use of research results in practice and medical technology assessment.            Seminar in the form of asynchronous e-learning</p>	B.W29, B.U13, D.U17, D.U16, C.U11
	<p><b>S6 - Methodology of preclinical research.</b>            Planning of pre-clinical research. Use of basic research results in clinical trials. Relevance and limitations of experimental studies.            Seminar in the form of asynchronous e-learning</p>	B.W29, B.U13, D.U16
	<p><b>S7 - Critical analysis of publications.</b>            Analysis of scientific articles using CONSORT and PRISMA guidelines. Systematic reviews and meta-analyses. Statistical versus clinical significance. Interpretation of survival using the Kaplan-Meier method            Seminar in the form of asynchronous e-learning</p>	G.W8, B.W29, B.U11, B.U12, B.U13, D.U17, D.U16, C.U11
	<p><b>S8 - Principles of preparing an abstract of a scientific article and a conference report.</b>            Rules for preparing clear and correct abstracts. Discussion of the most common mistakes made in scientific reports.            Seminar in the form of asynchronous e-learning</p>	G.W8, B.W29, B.U12, B.U13, D.U17, D.U16, C.U11

<b>Discussions</b>	<b>D1 - Data types, basic statistics for research</b> Exercise complementary to the topic S3. Exercise in the form of asynchronous e-learning	B.U11, B.U12, B.U13, D.U16
	<b>D2 - Statistical analysis of scientific data.</b> Statistical analysis of research data, interpretation of results, selection of optimal significance tests. Descriptive statistics, analysis of differences between groups. Practical use and interpretation of test results: Student's T-test, Mann-U-Whitney, Chi-square. Exercise in stationary form.	B.U11, B.U12, B.U13
	<b>D3-C5 Exercises complementary to the topics of seminars S6-S8.</b> Exercise in the form of synchronous e-learning.	G.W8, B.W29, B.U11, B.U12, B.U13, D.U17, D.U16, C.U11
	<b>D6 - Forms of scientific data presentation.</b> Principles of graphic presentation of results. Creating clear charts, tables and diagrams. Tools helpful in preparing presentations. Practicing presentation of results. Exercise in the form of synchronous and asynchronous e-learning.	B.U13, D.U17, D.U16, C.U11

## 7. LITERATURE

### Obligatory

Materials on the e-learning platform prepared by the Department of Methodology

### Supplementary

- Podstawy EBM czyli Medycyny opartej na danych naukowych dla lekarzy i studentów medycyny. Pod red. Piotra Gajewskiego, Romana Jaeschke, Jana Brożka. Wyd. Medycyna praktyczna, Kraków 2008, wyd. 1.
- Medical databases and professional medical journals – Pubmed, Embase, Scopus, Cochrane, Web of Science.
- Kodeks Etyki Lekarskiej, tekst jednolity z dnia 2 stycznia 2004r., zawierający zmiany uchwalone w dniu 20 września przez Nadzwyczajny VII Krajowy Zjazd Lekarzy, Warszawa 2004
- <https://poradnik-naukowy.gumed.edu.pl/>

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
<i>e.g. G.K1, G.S1, K1</i>	<i>This field defines the methods used for grading students e.g. pop quiz, test, written report etc.</i>	<i>e.g. threshold number of points</i>
G.W8, B.W29	Credit of e-course (S, C): test questions and practical tasks in the form of e-learning Passing the final test from the materials on the e-learning platform	Credit for classes in the form of e-learning.
B.U11, B.U12, B.U13, C.U11, D.U16, D.U17	Exercises and seminars (C, S) with an assistant: attendance, activity, realization of the topic, answering to the questions of the teacher and preparing a presentation on the last class.	Positive evaluation by the teacher.

## 9. ADDITIONAL INFORMATION (information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club)

### General comments.

The series of classes conducted by different Departments, led by the Department of Research Methodology, lasts for 6 weeks.

On the website of the Department of Research Methodology (<http://metodologia.wum.edu.pl/>) and on the e-learning platform there will be available schedules with information on how the classes will be conducted and the dates of classes for particular groups.

Full-time and e-learning synchronous classes (6 weekly meetings) will be held according to the schedule set for the following Dean's groups.

Seminars as well as Asynchronous Exercises and Lectures (C1, C5, W2) will be available on the e-learning platform (<https://e-learning.wum.edu.pl/login/index.php>) throughout the academic year.

The synchronous lecture (W1) takes place in the summer semester. The date will be communicated to the students at the beginning of the summer semester.

**ATTENTION - the condition to take the last class in the schedule for a given group is a positive result of the final test on the e-learning platform. To take the test you need to read all obligatory materials on the platform and pass all sub-tests (otherwise the test will not be available).**

We recommend that you familiarize yourself with the subsequent modules of the course on an ongoing basis. Many seminars (S3, S6-8, C6) constitute direct preparation for the exercise classes of the given topic (C2-C6) and the familiarisation with the material may be verified by the tutors during the classes.

Regulations and organization of classes:

1. Attendance at classes and seminars is compulsory.
2. Any absence from classes must be made up. Making up the classes at another time is possible only after an agreement with the Department, subject to availability. Inquiries about making up classes (e-learning and classes with an assistant) should be sent to: [metodologia@wum.edu.pl](mailto:metodologia@wum.edu.pl)
3. Part of the seminars is conducted in the form of e-learning. A student is obliged to do subsequent modules according to the schedule available on the e-learning platform.
4. Students are obliged to come to classes prepared to the content. Not being ready for classes is treated as an absence (especially during exercises C2-C6).
5. The condition to get the pass mark for the course is the participation in all classes and seminars and getting the positive mark of the assistant for the knowledge of the material provided for the given exercise and making and presenting the presentation during the last class.

The person responsible for didactics - Wiktor Paskal, MD, PhD. Contact via e-mail: [metodologia@wum.edu.pl](mailto:metodologia@wum.edu.pl)

Obtaining credit in the index is possible after completing all seminars, exercises and lecture in the summer semester.

There is a Student Scientific Society at the Department. Persons interested in cooperation are welcome to contact; SKN Supervisor - Wiktor Paskal, MD, PhD; e-mail: [metodologia@wum.edu.pl](mailto:metodologia@wum.edu.pl).

The profile of the Department's scientific activity - <https://metodologia.wum.edu.pl/node/81>

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## VOCATIONAL TRAINING

**Primary health care (family medicine) – 3 weeks – 90h**

**Emergency medical aid – 1 week – 30 h**

**2nd year, , 6-year program ED students**

**Faculty of Medicine**

Second year students are expected to have their summer training according to following rule:

- a) a three-week family medicine training in the outpatients' department at a teaching hospital – 90h,
- b) a one-week training in the emergency medical aid service – 30h.

The head of the department or an appointed supervisor assigns a detailed program of the training and scheduled duties and also evaluates students' performance.

Responsible for the appropriate course of the training is a fully qualified specialist in a particular medical, laboratory or nursing area.

Students are expected to perform under supervision, all the nursing procedures typical of the outpatients' departments and to be involved in carrying out examinations or investigations in particular diagnostic laboratories and departments.

The ultimate goals of instruction provided in the outpatients' department are:

1. to acquaint students with procedures concerning patients' registration, types of records and filing system used in the outpatients' departments,
2. to provide information on rules of referring patients on sick leaves, releasing sickness certificates, referrals to specialists, filling in particular forms and letters
3. to teach the techniques of repairing surgical dressing materials and surgical instrument for sterilization,
4. to acquaint students with the functioning of the treatment room, to teach them to give subcutaneous, intracutaneous and intramuscular injections, to perform diagnostic tests and to interpret the results,
5. to teach the technique of application of plaster of Paris,
6. to teach the theory and, if possible, the practical application of the first aid in emergencies,
7. to prepare students to assist the physician in minor procedures,
8. to prepare students to assist the physician in examining outpatients and participating in home rounds.

Students' practical training in the Ambulance Service comprises the following:

1. instruction in the scope of activities provided by the service (completing and filing records, assessing the time of temporary work disability, referring patients to hospital, rendering transport service, organizing emergency / rescue operation in mass poisoning, epidemics, accidents, natural disasters etc.
2. assisting the physician in providing emergency aid and shadowing them on home calls.
3. assisting the physician in general, resuscitation, accident and emergency, pediatric and ob/ gyn ambulance calls.
4. instruction in life-saving procedures.

**Throughout the course of the training students are expected to make records of their activities and procedures performed. They are also assessed by the instructor in charge and are finally granted their passing mark by the head of the department. Certificates written in English or translated should be submitted to the Dean's Office of the Medical University of Warsaw by September 20th of the subsequent academic year.**