

**Course description (syllabus) form for higher education, doctoral,
postgraduate and skills development programmes**

A. General course description

Field name	Comments
Course title	Pathophysiology
Unit organising the course	Nicolaus Copernicus University in Toruń Ludwik Rydygier Collegium Medicum in Bydgoszcz Faculty of Pharmacy Department of Pathophysiology
Unit for which the course is organised	Nicolaus Copernicus University in Toruń Ludwik Rydygier Collegium Medicum in Bydgoszcz Faculty of Medicine Full-time, long cycle education
Course ID	1655-Lek22PATO-J
ISCED code	0912
ECTS credit allocation	6.3
Form of course completion assessment	Exam
Language of instruction	English
Indication whether attempts at obtaining course credit can be repeated	No (The student receives ECTS once)
Affiliation of the course to a course group	Preclinical Sciences (Group C)
Total student workload	<p>1. The workload related to the classes requiring the direct participation of academic teachers is:</p> <ul style="list-style-type: none"> - participation in lectures: 30 hours, - participation in tutorials: 45 hours, - participation in the tests: 6 hours, - participation in the final exam: 2 hour. <p>The workload related to the activities requiring the direct participation of academic teachers is 83 hours, which corresponds to 3.32 ECTS points.</p> <p>2. Balance of student workload:</p> <ul style="list-style-type: none"> - participation in lectures: 30 hours, - participation in tutorials: 45 hours, - reading the indicated scientific literature: 15 hours, - preparation for the tutorials: 23 hours, - preparation for the tests and their passing: $20 + 6 = 26$ hours, - preparation for the final exam and its passing: $14 + 2 = 16$ hours, - preparation of a project/presentation: 2.5 hours. <p>The total student workload is 157.5 hours, which corresponds to 6.3 ECTS points.</p> <p>3. Workload related to conducted research:</p> <ul style="list-style-type: none"> - reading the indicated scientific literature: 15 hours, - participation in lectures (taking into account the results of research and scientific studies on the current state of knowledge on the pathophysiology of selected diseases): 20 hours,

	<ul style="list-style-type: none"> - participation in tutorials (taking into account the results of research and scientific studies on the current state of knowledge on the pathophysiology of selected diseases): 27 hours, - preparation for tutorials (taking into account the results of research and scientific studies in the field of the current state of knowledge on the pathophysiology of selected diseases): 13 hours, - preparation for the tests (taking into account the results of research and scientific studies in the field of the current state of knowledge on the pathophysiology of selected diseases): 13 hours, - preparation for the final exam (taking into account the results of research and scientific studies in the field of the current state of knowledge on the pathophysiology of selected diseases): 9 hours. <p>The total student workload related to the conducted research is 97 hours, which corresponds to 3.88 ECTS points.</p> <p>4. Time required to prepare and participate in the assessment process:</p> <ul style="list-style-type: none"> - preparation for tutorials (including reading the indicated literature): 12 hours, - preparation for the tests and their passing: $20 + 6 = 26$ hours, - preparation for the final exam and its passing: $14 + 2 = 16$ hours, - preparation of a project/presentation: 2.5 hours. <p>Total student workload to prepare for and participate in the assessment process: 56.5 hours, corresponding to 2.26 ECTS points.</p> <p>5. Balance of student workload of a practical nature:</p> <ul style="list-style-type: none"> - participation in tutorials: 45 hours. <p>The total student workload of a practical nature is: 45 hours, which corresponds to 1.8 ECTS points.</p> <p>6. Balance of student workload related with online education: not applicable.</p> <p>7. Time required for compulsory internships: not applicable.</p>
<p>Learning outcomes - knowledge</p>	<p>Student:</p> <p>W1: Uses pathomorphological nomenclature in the description of selected diseases (C.W26).</p> <p>W2: Discusses the participation of the inflammatory process of a specific and non-specific nature in the etiopathogenesis and course of selected disease entities, e.g., in atherosclerosis, diabetes, cancer, obesity, autoimmune diseases (C.W28).</p> <p>W3: Defines the classification, clinical picture, and compensation mechanisms of anaphylactic, septic, hypovolemic, cardiogenic, and neurogenic shock (C.W29).</p> <p>W4: Discusses the etiopathogenesis, clinical course, and diagnostics of selected disease entities of the cardiovascular, respiratory, nervous, endocrine, urogenital, hematopoietic, and digestive systems (C.W31).</p> <p>W5: Characterizes the consequences of developing tissue and organ damage with clinical symptoms of the disease and the results of diagnostic tests (C.W32).</p> <p>W6: Specifies external and internal pathogens, as well as modifiable and non-modifiable pathogens (C.W33).</p> <p>W7: Discusses the pathomechanism and clinical consequences of diseases of the cardiovascular, respiratory, nervous, endocrine, genitourinary, hematopoietic, digestive systems, as well as disturbances in the water-electrolyte and acid-base balance (C.W34).</p> <p>W8: Describes the directions of the newest therapeutic strategies for selected diseases (C.W42).</p> <p>W9: Discusses the role of oxidative stress in the pathogenesis of metabolic diseases, neurodegenerative diseases, and the aging process (C.W47).</p> <p>W10: Indicates disturbances in the metabolism of minerals and vitamins</p>

	<p>(C.W48). W11: Describes the effect of disturbances in the secretion of digestive enzymes on the development of diseases of the digestive system (C.W49). W12: Characterizes the influence of eating disorders on the development of civilization diseases (C.W50).</p>
Learning outcomes - skills	<p>Student: U1: Assesses changes at the cellular, tissue, and organ levels in the course of selected pathological states and associates them with clinical symptoms and test results (C.U011). U2: Interprets the results of laboratory tests in selected disease entities (C.U011). U3: Correctly plans the diagnostic and therapeutic algorithm of selected disease entities (C.U011).</p>
Learning outcomes - social competence	<p>Student: K1: Uses objective sources of scientific information in conjunction with the acquired knowledge in the pathophysiology of diseases (K_K01). K2: Respects ethical standards (K_K03). K3: Demonstrates an attitude of cooperation in a team (K_K06). K4: Demonstrates the attitude of continuous self-education (K_K07).</p>
Teaching methods	<p>Lectures: - informative lecture, - problem lecture, - seminar lecture, - case studies. Tutorials: - didactic discussion, - analysis of research, - case studies, - computer-assisted learning, - exposing methods: film, show, - simulation methods (case study), - didactic movies and games.</p>
Prerequisites	<p>To realize the described subject it is necessary to know elements of anatomy in the field of structure and topography of individual organs; physiology of the functions of individual organs and systems, biochemistry in the field of metabolic processes taking into account the metabolic pathways: carbohydrates, lipids, proteins, as well as the metabolism of nucleic acids.</p>
Brief course description	<p>Pathophysiology describes etiology and origins of mechanisms for functional disorders within an organism in various pathological stages. It covers pathophysiology of organs and systems, issues in relation to changes in adaptation functions of organism, disorders of organism's regulatory functions, metabolic disorders and pathophysiology of cancer.</p>
Full course description	<p>Lectures The aim of the lectures is to familiarize the student with the detailed mechanisms of the formation of disorders in organs and systems, as well as to extend the student's knowledge with clinical symptoms and diagnostics of individual disease entities. During the lectures the student discusses the etiopathogenesis of cardiovascular and endocrine diseases and the pathophysiology of the hematopoietic system. Tutorials Tutorials are aimed at: familiarizing the student with the detailed mechanisms of the formation of disorders in systems and organs, developing the ability to connect disorders at the cellular, tissue and organ levels with clinical symptoms and the results of research in</p>

	individual disease entities.														
Literature	<p>Primary literature</p> <ol style="list-style-type: none"> 1. McPhee SJ, Ganong WF: Pathophysiology of Disease: An Introduction to Clinical Medicine. International Edition. McGraw-Hill, 2006, 5th edition. 2. Copstead LE, Banasik J: Pathophysiology. Elsevier, 2013, 5th edition. <p>Supplementary literature</p> <p>Fauci AS, et al.: Harrison's Principles of Internal Medicine. McGraw-Hill, 2008, 17th edition.</p> <p>Chapters (Volume I & II): 98, 100, 104, 110, 221, 225, 226, 235, 248, 273, 274, 287, 300, 335, 338.</p>														
Assessment methods and criteria	<p>The basis for passing pathophysiology is obtaining positive grades from all pop quiz, partial tests, and final exam and adherence to the rules included in the Didactic Regulations of the Department of Pathophysiology.</p> <p>Final exam (60 questions), partial tests, pop quiz: a graded assessment based on the test questions (written test: short structured open questions (only for the pop quiz) and closed ones (single-choice test, answer matching test) on the knowledge gained during lectures and tutorials.</p> <p>To verify the learning outcomes achieved by the student, the following assessment criteria are used:</p> <table border="1"> <thead> <tr> <th>Percentage of points earned</th> <th>Grade</th> </tr> </thead> <tbody> <tr> <td>92 ≤ ... ≤ 100%</td> <td>Very good (5)</td> </tr> <tr> <td>88 ≤ ... < 92%</td> <td>Good plus (4.5)</td> </tr> <tr> <td>80 ≤ ... < 88%</td> <td>Good (4)</td> </tr> <tr> <td>71 ≤ ... < 80%</td> <td>Satisfactory plus (3.5)</td> </tr> <tr> <td>60 ≤ ... < 71%</td> <td>Satisfactory (3)</td> </tr> <tr> <td>0... < 60%</td> <td>Fail (2)</td> </tr> </tbody> </table> <p>Course credit criteria:</p> <p>Lectures:</p> <ul style="list-style-type: none"> - Tests: pass ≥ 60% (W1, W2, W4-W9, W11, U1, K1, K4). - Final exam (verification of learning outcomes from the entire cycle): pass ≥ 60% (W1-W12, U1-U3, K1, K4). <p>Tutorials:</p> <ul style="list-style-type: none"> - Tests, pop quiz: pass ≥ 60% (W1, W2, W4-W9, W11, U1-U3, K1). - Multimedia presentations: pass ≥ 60% (W1, W2, W4-W9, W11, U1, K1-K4). - Directed observation of the student during practical tasks (≥ 60%): W1, W2, W4-W9, W11, U1-U3, K1- K4). 	Percentage of points earned	Grade	92 ≤ ... ≤ 100%	Very good (5)	88 ≤ ... < 92%	Good plus (4.5)	80 ≤ ... < 88%	Good (4)	71 ≤ ... < 80%	Satisfactory plus (3.5)	60 ≤ ... < 71%	Satisfactory (3)	0... < 60%	Fail (2)
Percentage of points earned	Grade														
92 ≤ ... ≤ 100%	Very good (5)														
88 ≤ ... < 92%	Good plus (4.5)														
80 ≤ ... < 88%	Good (4)														
71 ≤ ... < 80%	Satisfactory plus (3.5)														
60 ≤ ... < 71%	Satisfactory (3)														
0... < 60%	Fail (2)														
Work placement	Not applicable														

B. Description of the course within the period of instruction

Field name	Comments
Period of instruction	2023/2024 (summer semester)
Form of assessment of course completion in the period of instruction	The same as in part A
Form(s) of classes, number of hours and completion assessment methods	The same as in part A
Name of course coordinator in the period of instruction	Prof. dr hab. Ewa Żekanowska
Names of persons managing student groups for the course	Dr hab. Artur Słomka, prof. UMK Dr Joanna Boinska Dr Justyna Małkowska Dr Inga Dziembowska Dr Ewelina Kolańska-Dams Lek. Mateusz Wartęga
Course attributes	Obligatory
Course groups including description and limit to the number of students within the groups	Lectures - all students Tutorials - 12 students
Time and place of classes	The dates and places of classes are given by the Department of Recruitment and Student Affairs of the CM UMK.
Number of study hours involving distance learning methods	Not applicable
Course website	https://www.wf.cm.umk.pl/katpatofiz/english-division/
Learning outcomes defined for a given form of classes within the course	Lecture: W1: Uses pathomorphological nomenclature in the description of selected diseases (C.W26). W2: Discusses the participation of the inflammatory process of a specific and non-specific nature in the etiopathogenesis and course of selected disease entities, e.g., in atherosclerosis, diabetes, cancer, obesity, autoimmune diseases (C.W28). W3: Defines the classification, clinical picture, and compensation mechanisms of anaphylactic, septic, hypovolemic, cardiogenic, and neurogenic shock (C.W29). W4: Discusses the etiopathogenesis, clinical course, and diagnostics of selected disease entities of the cardiovascular, respiratory, nervous, endocrine, urogenital, hematopoietic, and digestive systems (C.W31). W5: Characterizes the consequences of developing tissue and organ damage with clinical symptoms of the disease and the results of diagnostic tests (C.W32). W6: Specifies external and internal pathogens, as well as modifiable and non-modifiable pathogens (C.W33). W7: Discusses the pathomechanism and clinical consequences of diseases of the cardiovascular, respiratory, nervous, endocrine,

genitourinary, hematopoietic, digestive systems, as well as disturbances in the water-electrolyte and acid-base balance (C.W34).

W8: Describes the directions of the newest therapeutic strategies for selected diseases (C.W42).

W9: Discusses the role of oxidative stress in the pathogenesis of metabolic diseases, neurodegenerative diseases, and the aging process (C.W47).

W10: Indicates disturbances in the metabolism of minerals and vitamins (C.W48).

W11: Describes the effect of disturbances in the secretion of digestive enzymes on the development of diseases of the digestive system (C.W49).

W12: Characterizes the influence of eating disorders on the development of civilization diseases (C.W50).

U1: Assesses changes at the cellular, tissue, and organ levels in the course of selected pathological states and associates them with clinical symptoms and test results (C.U011).

K1: Uses objective sources of scientific information in conjunction with the acquired knowledge in the pathophysiology of diseases (K_K01).

K4: Demonstrates the attitude of continuous self-education (K_K07).

Tutorials:

W1: Uses pathomorphological nomenclature in the description of selected diseases (C.W26).

W2: Discusses the participation of the inflammatory process of a specific and non-specific nature in the etiopathogenesis and course of selected disease entities, e.g., in atherosclerosis, diabetes, cancer, obesity, autoimmune diseases (C.W28).

W4: Discusses the etiopathogenesis, clinical course, and diagnostics of selected disease entities of the cardiovascular, respiratory, nervous, endocrine, urogenital, hematopoietic, and digestive systems (C.W31).

W5: Characterizes the consequences of developing tissue and organ damage with clinical symptoms of the disease and the results of diagnostic tests (C.W32).

W6: Specifies external and internal pathogens, as well as modifiable and non-modifiable pathogens (C.W33).

W7: Discusses the pathomechanism and clinical consequences of diseases of the cardiovascular, respiratory, nervous, endocrine, genitourinary, hematopoietic, digestive systems, as well as disturbances in the water-electrolyte and acid-base balance (C.W34).

W8: Describes the directions of the newest therapeutic strategies for selected diseases (C.W42).

W9: Discusses the role of oxidative stress in the pathogenesis of metabolic diseases, neurodegenerative diseases, and the aging process (C.W47).

W11: Describes the effect of disturbances in the secretion of digestive enzymes on the development of diseases of the digestive system (C.W49).

U1: Assesses changes at the cellular, tissue, and organ levels in the course of selected pathological states and associates them with clinical symptoms and test results (C.U011).

U2: Interprets the results of laboratory tests in selected disease

	<p>entities (C.U011). U3: Correctly plans the diagnostic and therapeutic algorithm of selected disease entities (C.U011). K1: Uses objective sources of scientific information in conjunction with the acquired knowledge in the pathophysiology of diseases (K_K01). K2: Respects ethical standards (K_K03). K3: Demonstrates an attitude of cooperation in a team (K_K06). K4: Demonstrates the attitude of continuous self-education (K_K07).</p>														
<p>Assessment methods and criteria for a given form of classes within the course</p>	<p>The basis for passing pathophysiology is obtaining positive grades from all pop quiz, partial tests, and final exam and adherence to the rules included in the Didactic Regulations of the Department of Pathophysiology.</p> <p>Final exam (60 questions), partial tests, pop quiz: a graded assessment based on the test questions (written test: short structured open questions (only for the pop quiz) and closed ones (single-choice test, answer matching test) on the knowledge gained during lectures and tutorials.</p> <p>To verify the learning outcomes achieved by the student, the following assessment criteria are used:</p> <table border="1" data-bbox="619 920 1390 1200"> <thead> <tr> <th>Percentage of points earned</th> <th>Grade</th> </tr> </thead> <tbody> <tr> <td>$92 \leq \dots \leq 100\%$</td> <td>Very good (5)</td> </tr> <tr> <td>$88 \leq \dots < 92\%$</td> <td>Good plus (4.5)</td> </tr> <tr> <td>$80 \leq \dots < 88\%$</td> <td>Good (4)</td> </tr> <tr> <td>$71 \leq \dots < 80\%$</td> <td>Satisfactory plus (3.5)</td> </tr> <tr> <td>$60 \leq \dots < 71\%$</td> <td>Satisfactory (3)</td> </tr> <tr> <td>$0 \dots < 60\%$</td> <td>Fail (2)</td> </tr> </tbody> </table> <p>Course credit criteria: Lectures: - Tests: pass $\geq 60\%$ (W1, W2, W4-W9, W11, U1, K1, K4). - Final exam (verification of learning outcomes from the entire cycle): pass $\geq 60\%$ (W1-W12, U1-U3, K1, K4). Tutorials: - Tests, pop quiz: pass $\geq 60\%$ (W1, W2, W4-W9, W11, U1-U3, K1). - Multimedia presentations: pass $\geq 60\%$ (W1, W2, W4-W9, W11, U1, K1-K4). - Directed observation of the student during practical tasks ($\geq 60\%$): W1, W2, W4-W9, W11, U1-U3, K1- K4).</p>	Percentage of points earned	Grade	$92 \leq \dots \leq 100\%$	Very good (5)	$88 \leq \dots < 92\%$	Good plus (4.5)	$80 \leq \dots < 88\%$	Good (4)	$71 \leq \dots < 80\%$	Satisfactory plus (3.5)	$60 \leq \dots < 71\%$	Satisfactory (3)	$0 \dots < 60\%$	Fail (2)
Percentage of points earned	Grade														
$92 \leq \dots \leq 100\%$	Very good (5)														
$88 \leq \dots < 92\%$	Good plus (4.5)														
$80 \leq \dots < 88\%$	Good (4)														
$71 \leq \dots < 80\%$	Satisfactory plus (3.5)														
$60 \leq \dots < 71\%$	Satisfactory (3)														
$0 \dots < 60\%$	Fail (2)														
<p>Course content</p>	<p><u>Lectures (2 academic hours)</u></p> <ol style="list-style-type: none"> 1. Pathophysiology in an interdisciplinary approach. 2. The role of the inflammatory process in the pathophysiology of diseases. 3. Pathophysiology of atherosclerosis and ischemic heart disease. 4. Pathophysiology and classification of shock. 5. Etiopathogenesis of arterial hypertension. 6. Insomnia and disturbances of circadian rhythms. 7. Disorders of carbohydrate metabolism. 8. Obesity and metabolic syndrome. 9. Disturbances in the metabolism of minerals and vitamins. Eating disorders. 														

	<p>10. Hematopoiesis. Diseases of the red blood cell system. 11. Diseases of the white blood cell system. 12. Hemostasis. Hemorrhagic diathesis. 13. Thrombophilia. 14. Pathophysiology of the aging process. Neurodegenerative diseases. 15. Cancers. Mechanisms of neoplastic transformation.</p> <p><u>Tutorials (3 academic hours)</u></p> <p>1. Changes in the electrocardiogram record. Disorders of stimulus and conduction of the heart. 2. Ischemic heart disease and acute coronary syndromes. 3. Cardiovascular disorders in COVID-19. 4. Pathophysiology of the respiratory system. 5. Disturbances of acid-base balance. 6. Pathophysiology of kidney diseases. 7. Disorders of calcium and phosphate metabolism. 8. Pathophysiology of diabetes mellitus. 9. Pathomechanism of pituitary and thyroid diseases. 10. Pathomechanism of adrenal gland diseases. Overactive and underactive of sex glands. 11. Liver pathology. Digestive system pathology. 12. Pathophysiology of anemia. 13. Pathophysiology of the proliferative states of the white blood cell system. 14. Pathophysiology of blood hypercoagulability. 15. Pathophysiology of congenital and acquired bleeding disorders.</p>
Teaching methods	<p>Lectures: - informative lecture, - problem lecture, - seminar lecture, - case studies.</p> <p>Tutorials: - didactic discussion, - analysis of research, - case studies, - computer-assisted learning, - exposing methods: film, show, - simulation methods (case study), - didactic movies and games.</p>
Literature	<p>Primary literature</p> <p>1. McPhee SJ, Ganong WF: Pathophysiology of Disease: An Introduction to Clinical Medicine. International Edition. McGraw-Hill, 2006, 5th edition. 2. Copstead LE, Banasik J: Pathophysiology. Elsevier, 2013, 5th edition.</p> <p>Supplementary literature</p> <p>Fauci AS, et al.: Harrison's Principles of Internal Medicine. McGraw-Hill, 2008, 17th edition. Chapters (Volume I & II): 98, 100, 104, 110, 221, 225, 226, 235, 248, 273, 274, 287, 300, 335, 338.</p>