

# SYLLABUS

**Name:** Fiziologia człowieka z elementami fizjologii klinicznej (1655-Lek22FIZJ-J)

**Name in Polish:**

**Name in English:** Human Physiology with Elements of Clinical Physiology

## Information on course:

**Course offered by department:** Department of Human Physiology

**Course for department:** Faculty of Medicine

**Term:** Summer semester 2023/24

**Cordinator of course edition:** prof. dr hab. Małgorzata Tafil-Klawe

## Default type of course examination report:

Examination

## Language:

English

## Short description:

Human Physiology with elements of clinical physiology course allows to learn concepts and understand regulatory processes of human of system and organs. It also allows to understand the interactions between human body systems.

## Description:

The aim of Human Physiology with elements of clinical physiology course is to present to Student physiological processes and mechanisms responsible for homeostasis in human body. During Physiology course lectures physiology fundaments are presented with special regards to: cardiovascular system, endocrine system, urinary system, gastrointestinal system and acid-base balance. Student is also going to learn about regulation of fluid and electrolyte balance and renal physiology including renal autoregulation. Next, Student is going to learn about the hemostasis and the effects of disturbance of hemostasis. During following lecture, Student is going to learn about gastrointestinal system physiology and neural control of digestive functions.

Tutorials are laboratory in nature and are connected with the subject of lectures. At the beginning of the course Student is going learn about the impact of environmental factors on the functioning of the respiratory system and the importance of the spirometric test in assessing the functioning of the respiratory system. The aim of cardiovascular system physiology classes is to acquaint Student with the principles of ECG and blood pressure examination. as well as the influence of verticalization on cardiovascular system. Next, Student is going to learn blood physiology and basic laboratory parameters. Furthermore, Student is going to learn about filtration, renal autoregulation and hormonal regulation of urine volume, urine concentration and urine composition as well. Next, Student is going to learn about action of buffers, acid-base balance and their importance in human homeostasis. The aim of endocrine glands physiology course is to present to Student the mechanism of hormones action as well as the consequences of disturbance in hormonal regulation. Also, the course and regulation of female and male reproductive functions is going to be a subject of the practical classes. During gastrointestinal system physiology Student is going to learn about the enzymes participating in digestion, mechanism of production of the hydrochloric acid in the stomach, the role of bile, and the process of absorption of digestion products. During following classes Student is going to learn about metabolic profile of major organs and systems. Moreover, analysis of energy balance and neurohormonal regulation of body mass is going to be used in understanding of the rules of feeding as well the elimination of improper behaviour causing metabolic disorders and so-called a disease of civilization. At the end of Physiology course Student is going to learn about neurobiological principles for the reflexes and the movement control system as well the relationship between movement control system and cardiovascular system.

## Bibliography:

Primary literature:

1. Walter F. Boron, Emile L. Boulpaep, Medical Physiology, Elsevier Health Sciences, 2016 or newer
2. Rhoades RA, Bell DR: Medical Physiology. Principles for clinical medicine, Walters Kluwer, Lippincott Williams and Wilkins, 2013
3. Guyton AC, Hall JE: The Textbook of Medical Physiology, Elsevier Saunders, 2020

Additional Literature:

1. Cardiovascular Physiology Concepts, Wolters Kluwer, 2021

## Assessment methods and assessment criteria:

1. Student passes the course after receiving a positive grade on all mid-semester tests in the winter and summer semester, as well as on the exam.

2. Three mid-semester tests will be conducted in the summer semester:

Colloquium No. 3, covering the thematic block: Cardiovascular system physiology

Colloquium No. 4, covering the thematic block: Respiratory System Physiology, Kidneys Physiology

Colloquium No. 5, covering the thematic block: Digestive System Physiology, Acid-Base Balance

3. During the tutorial, the Student can obtain 5 points:

4 points from an entrance test

1 point for active participation in tutorial

4. The entrance tests cannot be retaken by the Student.

5. To be eligible to participate in the mid-semester test, a student must score at least 60% of the maximum points achievable from tutorials within the respective colloquium. The following table illustrates the relationship between points and eligibility for the mid-semester tests.:

Colloquium No. 3: Cardiovascular system physiology, max points 30, threshold  $\geq 18$

Colloquium No. 4: Respiratory system physiology, Kidney physiology, max points 30, threshold  $\geq 18$

Colloquium No. 5: Digestive system physiology, Metabolism, max points 15, threshold  $\geq 9$

6. During the tutorial, the Student can obtain 5 points:

4 points from an entrance test

1 point for active participation in tutorial

7. The entrance tests cannot be retaken by the Student.

8. The Student will receive a positive grade for the colloquium upon achieving a minimum of 60% of the total possible points. Point conversions, as per the Dean's Council Resolution WL No. 33/21, as outlined in the table below:

92 ≤ ..... ≤ 100 excellent (5)

88 ≤ ..... < 92 very good (4+)

80 ≤ ..... < 88 good (4)

71 ≤ ..... < 80 satisfactory (3+)

60 ≤ ..... < 71 sufficient (3)

< 60 unsatisfactory/ failed (2)

9. After failing the colloquium, the Student has the right to single retake of the colloquium.
10. If the student fails to reach the 60% threshold of the maximum tutorial points within a specific colloquium or does not pass the colloquium in first or retake terms, The Student is required to undergo a commission-assisted evaluation for that particular colloquium.
11. The exam format consists of a single-choice test containing 100 closed questions, each with four possible answers: one correct answer and three distractors (with no penalty for incorrect answers). Each correct answer earns the student 1 point. Exam results will be disclosed within a maximum of five days following the examination.
12. Student receives a positive grade from the exam after obtaining at least 60% of the maximal number of points. Point conversions are presented in the table below in accordance with the Dean's Council Resolution WL No. 33/21, as outlined in the table below:
- 92≤.....≤100 excelent (5)  
 88≤.....<92 very good (4+)  
 80≤.....<88 good (4)  
 71≤.....<80 satisfactory (3+)  
 60≤.....<71sufficient (3)  
 <60 unsatisfactory/ failed (2)
13. The Student who has not passed the exam may retake it on the date specified by the Head of the Department. This date will be announced at least one month in advance, or earlier by mutual agreement. Additionally, at the Student's request and in justified cases, the Dean may appoint a commission exam.

Written semi-final tests ( ≥60 %): W1, W3-W11, U2, K1,  
 Entrance tests ( ≥60 %): W1-W11, U1, U2, K1  
 Lab reports/ work sheets ( ≥60 %): W1-W4, W6-W11, U1, U2, K1  
 Observation: (≥60 %): K1  
 Exam: (≥60 %) : W1-W11, U1, U2

#### Total student workload

##### 1. Study hours involving teacher participation:

- lectures: 30 hours
- tutorials: 55 hours
- semi-final tests: 4 hours
- exam: 2 hours

Total workload involving student and teacher participation is 96 hours, which is 3,84 ECTS

##### 2. Student's workload balance:

- lecture participation: 30 hours
- tutorials participation: 55 hours
- preparation for the tutorials (including topic related literature): 15 hours
- preparation of the lab reports or worksheets: 10 hours
- preparation for the semi- final tests, semi-final tests: 30+4= 34 hours
- preparation for exam and the exam: 10+2=12 hours

Total student's workload is 170 hours, which is 6,8 ECTS

##### 3. Student's workload balance due to scientific activity:

- reading topic- related literature: 20 hours
- lecture participation (including presentation of scientific publication): 30 hours
- tutorials participation (including presentation of scientific publication): 25 hours
- preparation for tutorials covering scientific activity: 10 hours

Total workload involving preparation for the evaluation process is 85 hours, which is 3,4 ECTS

##### 4. Time required for preparation and participation in the evaluation:

- preparation for the semi- final tests, semi-final tests: 32+4= 36 hours
- preparation for exam and the exam: 12+2=14 hours

Total student's active workload is 50 hours, which is 1,8 ECTS

##### 5. Student's practical workload balance:

- participation in the tutorials: 55 hours

Total student's active workload is 55 hours, which is 2,2 ECTS

##### 6. Time required for obligatory practice:

not applicable

#### Learning outcomes - knowledge

- W1: Describes the mechanisms responsible for maintaining water and electrolyte balance in the human body (B.W01).
- W2: : Knows the ways of inter-cellular communication and communication between a cell and extracellular matrix (B.W20)
- W3: Knows and can explain the chemical and electrical information conductance, as well as smooth muscle contraction mechanism.
- W4: Knows blood components and their function ( B.W20)
- W5. Knows the function and control mechanisms of all organs and systems, including cardiovascular system, gastrointestinal system, urinary system and skin integuments and understands the relationships between the (B.W21).
- W6. Knows the course and regulation of female and male reproductive functions (B.W22).
- W7: Knows basic parameters defining efficiency of particular systems and organs, including the reference values (B.W.24)
- W8: Knows the consequences of deficiency and too high levels of vitamins and minerals in the human body (C.W48).
- W9. Knows the mechanism of production of hydrochloric acid in the stomach, the role of bile, enzymes involved in digestion and the course of absorption of digestion products (C.W50).
- W10. Knows the consequences of poor nutrition (malnourishment), including prolonged starvation, high caloric meals intake
- W11: Knows the mechanism of hormones action on cellular level, hormones' production and release regulatory mechanisms and the consequences of disturbances in hormonal regulation (C.W51).

**Learning outcomes - skills**

U1. Perform simple function test assessing the human body as a system of stable regulation (ECG, spirometry, dynamic and static exercises fitness tests), interprets numerical data referring to basic physiological variables (B.U7)  
 U2. Describe integrated human body response to homeostasis disturbance, especially exposure to high or low temperature, loss of blood or water, sudden verticalization or transition from sleep to wake-up state (B.U20)

**Learning outcomes - social competencies**

K1. Has knowledge regarding reliable source of information (K\_K01)

**Teaching methods**

Lectures:  
 • Problem-based lecture with multimedia presentation  
 • Informational lecture (conventional)  
 Laboratory exercises:  
 • Laboratory  
 • Observation  
 • Problem-based classical method  
 • Discussion  
 • Demonstration

**Observation/demonstration teaching methods**

- display

**Expository teaching methods**

- informative (conventional) lecture  
 - problem-based lecture

**Exploratory teaching methods**

- practical  
 - classic problem-solving  
 - laboratory  
 - observation

**Prerequisites**

Before the course Student is obliged to have the knowledge regarding nervous, respiratory and cardiovascular system anatomy and physiology on the high school level.

**Information on course edition:****Default type of course examination report:**

Examination

**Short description:**

Human Physiology with elements of clinical physiology course allows to learn concepts and understand regulatory processes of human of system and organs. It also allows to understand the interactions between human body systems.

**Description:**

The aim of Human Physiology with elements of clinical physiology course is to present to Student physiological processes and mechanisms responsible for homeostasis in human body. During Physiology course lectures physiology fundamentals are presented with special regards to: cardiovascular system, endocrine system, urinary system, gastrointestinal system and acid-base balance. Student is also going to learn about regulation of fluid and electrolyte balance and renal physiology including renal autoregulation. Next, Student is going to learn about the hemostasis and the effects of disturbance of hemostasis. During following lecture, Student is going to learn about gastrointestinal system physiology and neural control of digestive functions.

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**Details of classes and study groups**

Lecture (30 hours)

**Bibliography:**

Primary literature:

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2. Rhoades RA, Bell DR: Medical Physiology. Principles for clinical medicine, Walters Kluwer, Lippincott Williams and Wilkins, 2013
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Additional Literature:

**Learning outcomes:**

- W1: Describes the mechanisms responsible for maintaining water and electrolyte balance in the human body (B.W01).  
W2: Knows the ways of inter-cellular communication and communication between a cell and extracellular matrix (B.W20)  
W3: Knows and can explain the chemical and electrical information conductance, as well as smooth muscle contraction mechanism.  
W4: Knows blood components and their function ( B.W20)  
W5. Knows the function and control mechanisms of all organs and systems, including cardiovascular system, gastrointestinal system, urinary system and skin integuments and understands the relationships between the (B.W21).  
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W11: Knows the mechanism of hormones action on cellular level, hormones' production and release regulatory mechanisms and the consequences of disturbances in hormonal regulation (C.W51).  
U1: Perform simple function test assessing the human body as a system of stable regulation (ECG, spirometry, dynamic and static exercises fitness tests), interprets numerical data referring to basic physiological variables (B.U7)  
U2. Describe integrated human body response to homeostasis disturbance, especially exposure to high or low temperature, loss of blood or water, sudden verticalization or transition from sleep to wake-up state (B.U20)  
K1. Has knowledge regarding reliable source of information (K K01)

**Assessment methods and assessment criteria:**

1. Student passes the course after receiving a positive grade on all mid-semester tests in the winter and summer semester, as well as on the exam.
2. Three mid-semester tests will be conducted in the summer semester:  
Colloquium No. 3, covering the thematic block: Cardiovascular system physiology  
Colloquium No. 4, covering the thematic block: Respiratory System Physiology, Kidneys Physiology  
Colloquium No. 5, covering the thematic block: Digestive System Physiology, Acid-Base Balance
3. During the tutorial, the Student can obtain 5 points:  
4 points from an entrance test  
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4. The entrance tests cannot be retaken by the Student.
5. To be eligible to participate in the mid-semester test, a student must score at least 60% of the maximum points achievable from tutorials within the respective colloquium. The following table illustrates the relationship between points and eligibility for the mid-semester tests:  
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7. The entrance tests cannot be retaken by the Student.
8. The Student will receive a positive grade for the colloquium upon achieving a minimum of 60% of the total possible points. Point conversions, as per the Dean's Council Resolution WL No. 33/21, as outlined in the table below:  
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Observation: ( $\geq 60\%$ ): K1  
Exam: ( $\geq 60\%$ ): W1-W11, U1, U2

**Classes topics:**

1. Electrical activity of the heart

2. Mechanism of myocardial contraction. The contraction force regulation
3. The heart contractility regulation. The impact of autonomic nervous system on contraction force
4. Heart rate and blood pressure regulation. The importance of RAA axis in cardiovascular system.
5. The basic of respiratory system
6. Mechanics of respiration
7. Regulation of respiratory function.
8. Glomerular filtration and intrarenal regulation mechanisms: glomerulotubular balance, myogenic autoregulation, metabolic regulation, tubuloglomerular feedback
9. Tubular transport mechanisms. Diuretics impact on renal tubule.
10. Water-electrolyte balance.
11. Regulation of gastrointestinal function.
12. Physiology of the liver, the role of bile.
13. Cardiorespiratory interactions
14. The impact of long-term starvation, eating too much and eating an unbalanced diet on the human body. Metabolism
15. Acid-base balance.

**Teaching methods:**

expository teaching methods- informative lecture (conventional), problem- based lecture with multimedia presentation

**Study groups details**

Group number 1

**Class instructors:**

prof. dr hab. Małgorzata Tafil-Klawe

dr Wieńczysława Adamczyk

dr Katarzyna Dmitruk

**Tutorial (55 hours)**

**Bibliography:**

Primary literature:

1. Walter F. Boron, Emile L. Boulpaep, Medical Physiology, Elsevier Health Sciences, 2016 or newer
2. Rhoades RA, Bell DR: Medical Physiology. Principles for clinical medicine, Walters Kluwer, Lippincott Williams and Wilkins, 2013
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 U1: Perform simple function test assessing the human body as a system of stable regulation (ECG, spirometry, dynamic and static exercises fitness tests), interprets numerical data referring to basic physiological variables (B.U7)  
 U2. Describe integrated human body response to homeostasis disturbance, especially exposure to high or low temperature, loss of blood or water, sudden verticalization or transition from sleep to wake-up state (B.U20)  
 K1. Has knowledge regarding reliable source of information (K K01)

**Assessment methods and assessment criteria:**

1. Student gain the credit from the tutorials after receiving a positive grade on all mid-semester tests in the summer semester.
2. Three mid-semester tests will be conducted in the summer semester:  
 Colloquium No. 3, covering the thematic block: Cardiovascular system physiology  
 Colloquium No. 4, covering the thematic block: Respiratory System Physiology, Kidneys Physiology  
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3. During the tutorial, the Student can obtain 5 points:  
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71≤.....<80 satisfactory (3+)

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<60 unsatisfactory/ failed (2)

9. After failing the colloquium, the Student has the right to single retake of the colloquium.

10. If the student fails to reach the 60% threshold of the maximum tutorial points within a specific colloquium or does not pass the colloquium in first or retake terms. The Student is required to undergo a commission-assisted evaluation for that particular colloquium.

#### **Classes topics:**

1. Electrical activity of the heart. Influence of the autonomic nervous system on the electrical activity of the heart

2. The structure and the functions of conductive system of the heart. Conduction velocity. The impact of various chemical substances on the heart

3. Electrocardiography

4. Arterial blood pressure and its regulation. Hemodynamic cycle. Heart contraction force regulation. The volume- pressure loop.

5. The impact of body position on cardiovascular system. Orthostatic test Microcirculation- active and passive congestion

6. The impact of static and dynamic exercise on cardiovascular system

7. Mechanics of respiration

8. Spirometry- methodology and results interpretation.

9. Regulation of respiratory function

10. Water and electrolyte balance. Effect of different osmolarity solution drinking on diuresis.

11. Autoregulatory mechanisms in the kidney. Mechanism of tubular transport.

12. Kidney function assesment- laboratory parameters.

13. Physiology of the digestive system.

14. The mechanism of hydrochloric acid production in the stomach, the role of bile. Absorption of digestive products. Metabolism.

15. Effects of physical exercise on the human body

#### **Teaching methods:**

Expository teaching methods:

- laboratory,
- observation,
- classical problem- based practical classes,
- discussion,
- presentation

#### **Study groups details**

Group number 1

##### **Class instructors:**

dr Wieńczysława Adamczyk

dr Małgorzata Gałązka

dr Katarzyna Dmitruk

dr Monika Zawadka-Kunikowska

mgr Monika Bejtka

Group number 2

##### **Class instructors:**

dr Wieńczysława Adamczyk

dr Małgorzata Gałązka

dr Katarzyna Dmitruk

dr Monika Zawadka-Kunikowska

mgr Monika Bejtka

Group number 3

##### **Class instructors:**

dr Wieńczysława Adamczyk

dr Małgorzata Gałązka

dr Katarzyna Dmitruk

dr Monika Zawadka-Kunikowska

mgr Monika Bejtka

Group number 4

##### **Class instructors:**

dr Wieńczysława Adamczyk

dr Małgorzata Gałązka

dr Katarzyna Dmitruk

dr Monika Zawadka-Kunikowska

mgr Monika Bejtka

## Study groups details

Group number 5

### Class instructors:

dr Wieńczysława Adamczyk  
dr Małgorzata Gałązka  
dr Katarzyna Dmitruk  
dr Monika Zawadka-Kunikowska  
mgr Monika Bejtka

Group number 6

### Class instructors:

dr Wieńczysława Adamczyk  
dr Małgorzata Gałązka  
dr Katarzyna Dmitruk  
dr Monika Zawadka-Kunikowska  
mgr Monika Bejtka

### Element of course groups in various terms:

Course group description	First term	Last term
<i>missing group description in English</i> (16550147-22-O)	2021/22	
All university courses (0000-ALL)	2021/22	

### Course credits in various terms:

<without a specific program>			
Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	6,8	2021/22	