## **Course description**

#### Part 1

General information about the course		
1. Major of study: medicine	2. Study level: unified MSc	
	3. Form of study: intramural	
4. Year: III, IV	5. Semester: VI, VII	
6. Course name: physiology		
7. Course status: required		

8. Course contents and assigned learning outcomes

To provide a clear and thorough practical working knowledge of the physiology of major systems within the human body as well as to have students to apply this knowledge to problems and case studies relevant to clinical physiology.

Learning outcomes / reference to learning outcomes indicated in the standards

For knowledge – student knows and understands: B.W.1; B.W.2; B.W.3; B.W.5; B.W.7; B.W.17; B.W.20;

B.W.21; B.W.22, B.W.23, B.W.24; B.W.25

For skills student can do: B.U.7, B.U.9, B.U.10, C.U.20

For social competencies student is ready to: notice and recognize own limitations and make selfassessment of educational deficits and needs; make use of objective sources of knowledge; formulate conclusions from own measures and observations; efficient cooperation with others

9. Number of hours for the course			120
10. Number of ECTS points for the course			9
11. Methods of verification and	evaluation of learning outcomes		
Learning outcomes	Methods of verification	Methods of evalu	uation*
Knowledge	Grade credit – MCQ	*	
Skills	Observation	*	
Competencies	Observation	*	

<sup>\*</sup> The following evaluation system has been assumed:

**Very good (5,0)** – the assumed learning outcomes have been achieved and significantly exceed the required level

**Better than good (4,5)** – the assumed learning outcomes have been achieved and slightly exceed the required level

**Good (4,0)** – the assumed learning outcomes have been achieved at the required level **Better than satisfactory (3,5)** – the assumed learning outcomes have been achieved at the average required level

**Satisfactory (3,0)** – the assumed learning outcomes have been achieved at the minimum required level

Unstatisfactory (2,0) – the assumed learning outcomes have not been achieved

# **Course description**

## Part 2

Other useful informa	ition about the o	course	
<b>12. Name of Departr</b> Department of Physic	ment, mailing ac	<mark>ldress, e-mail:</mark> Medical Sciences in Katowice, 18 Medyków St., 40-752	2
Katowice; <u>fzjkatpl@si</u>	<u>um.edu.pl</u> ; <u>mlar</u> y	<u>yszbrysz@sum.edu.pl</u>	
13. Name of the cour	rse coordinator:		
Joanna Lewin-Kowalil	k		
14. Prerequisites for	knowledge, skill	Is and other competencies:	
Completing of pre-me	edical college; ba	asic knowledge in science (biology, chemistry, physics)	
15. Number of stud	ents in groups	In accordance with the Senate Resolution	
16. Study materials	Presentations prepared and provided by instructors  Laboratory equipment indispensable for conducting practical classes		practical
17. Location of class	Lectures and seminars: rooms provided by Dean's Office Labs: lab room of Department of Physiology		fice
18. Location and tin	, 5,,		
hours		Mondays 10.a.m1 p.m.	
19. Learning outcome	es		Reference to
Number of the			
course learning		Course learning outcomes	learning outcomes
outcome		Course learning outcomes	
outcome			indicated in the standards
P_W01 / C_K01	Knows and und	derstands water-electrolyte balance in biologic	B.W.1
P_W02 / C_K02	Knows and understands acid-base balance and mechanism of buffer action as well as their importance for homeostasis		B.W.2
P_W03 / C_K03			B.W.3
P_W04 / C_K04		derstands physical laws describing fluid flow and ng blood flow resistance	B.W.5
P_W05 / C_K06	Knows and und sensory organs	derstands physicochemical and molecular basis of sfunction	B.W.7
P_W06 / C_K06		derstands ways of communication between cells and nd extracellular matrix, as well as signaling pathways	B.W.17
P_W07 / C_K07	Knows and und in nervous syst	derstands mechanism of excitation and conduction tem as well as higher nervous functions, and striated muscles and functions of blood	B.W.20
P_W08 / C_K08	Knows and und	derstands function and regulatory mechanisms of all and systems, including circulatory, respiratory,	B.W.21

P_W09 / C_K09   Knows and understands mechanism and regulation of reproduction in females and males   P.W10 / C_K10   Knows and understands mechanism of ageing   B.W.23   R.W.24   E.W.25   E.W		alimentary, urinary and relationships between them		
P_W10 / C_K10   Rnows and understands mechanism of ageing   B.W.23   P_W11 / C_K11   Knows and understands basic quantitative parameters describing efficiency of particular systems and organs   B.W.24   P_W11 / C_K11   Knows and understands basic quantitative parameters describing efficiency of particular systems and organs   B.W.25	D 11/00 / 0 1/00	Knows and understands mechanism and regulation of R M		1.22
P_W10 / C_K10         Knows and understands mechanism of ageing         B.W.23           P_W11 / C_K11         Knows and understands basic quantitative parameters describing efficiency of particular systems and organs         B.W.24           P_W12 / C_K12         Knows and understands connection between factors disturbing balance of biological processes and physiologic and pathophysiologic changes         B.W.25           P_U01 / C_S01         Can conduct simple functional tests assessing human body as a stable regulation system (exercise and load tests) and interpret numerical data referring to the basic physiologic variables         B.U.7           P_U02 / C_S02         Can operate simple measuring instruments and assess the acruacy of performed measures         B.U.9           P_U03 / C_S03         Can use databases including internet ones and seek for information using available tools         B.U.10           P_U04 / C_S04         Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake         Number of hours           21.1 Lectures         Internal environment, homeostasis, body fluids         2           Rodical-base balance         1           Blood         1           Excitability         4           Metabolism         1           Thermoregulation         4           Gastrointeest s	D Will it kill I			
P_W11 / C_K11 Knows and understands basic quantitative parameters describing efficiency of particular systems and organs  Knows and understands connection between factors disturbing balance of biological processes and physiologic and pathophysiologic changes  Can conduct simple functional tests assessing human body as a stable regulation system (exercise and load tests) and interpret numerical data referring to the basic physiologic variables  P_U02 / C_S02 Can operate simple measuring instruments and assess the accuracy of performed measures  Can use databases including internet ones and seek for information using available tools  Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake  20. Forms and topics of classes  21.1. Lectures  Internal environment, homeostasis, body fluids  2 Acid-base balance  Blood  1 Acid-base balance  Blood  1 Acid-base balance  Blood  1 Acid-strointestinal tract  Kidneys and urinary system  4 Acid-strointestinal tract  Kidneys and urinary system  5 Acid-base balance  Blood  1 A	P W10 / C K10			<i>I</i> .23
Efficiency or particular systems and organs   B.W.25			B.W	1.24
P_W12 / C_K12 balance of biological processes and physiologic and pathophysiologic changes Can conduct simple functional tests assessing human body as a stable regulation system (exercise and load tests) and interpret numerical data referring to the basic physiologic variables P_U02 / C_502 Can operate simple measuring instruments and assess the accuracy of performed measures P_U03 / C_503 information using available tools Can use databases including internet ones and seek for information using available tools Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake  20. Forms and topics of classes  21.1. Lectures Internal environment, homeostasis, body fluids 2 Acid-base balance Blood 1 1 Excitability 2 2 Muscles 2 2 Muscles 4 4 Circulation 4 4 Respiration 4 4 Respiration 5 4 Reproductive system 6 6 Romones and endocrinal system 6 6 Romones and endocrinal system 7 4 Reproductive system 9 2 2 2.2. Seminars 1 1 Rescritability 1 1 Muscles 1 2 Respiration 1 1 Rescritability 1 1 Respiration 3 Respiration 4 Acid-base balance 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. Seminars 1 1 Reproductive system 9 2 2 2.2. S	P_W11 / C_K11	·		
pathophysiologic changes  Can conduct simple functional tests assessing human body as a stable regulation system (exercise and load tests) and interpret numerical data referring to the basic physiologic variables  P_U02 / C_S02  Can operate simple measures instruments and assess the accuracy of performed measures  Can use databases including internet ones and seek for information using available tools  Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake  20. Forms and topics of classes  21.1. Lectures  Internal environment, homeostasis, body fluids  Acid-base balance  Blood  1 1  Excitability  2 2  Heart  Circulation  Aketabolism  Thermoregulation  Gastrointestinal tract  Kidneys and urinary system  Acid-base balance  Bodod  1 1  Bodod  1 1  Castrointestinal tract  Acid-base balance  Bodod  Acid-base balance  Acid-base balance  Bodod  Acid-base balance  Acid-base balance  Acid-base balance  Acid-base balance  Acid-base balance  Acid-ba		Knows and understands connection between factors disturbing	B.W	<i>I</i> .25
P_U01 / C_S01   Can conduct simple functional tests assessing human body as a stable regulation system (exercise and load tests) and interpret numerical data referring to the basic physiologic variables   B.U.9   P_U02 / C_S02   Can operate simple measuring instruments and assess the accuracy of performed measures   B.U.9   P_U03 / C_S03   Can use databases including internet ones and seek for information using available tools   Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake    20. Forms and topics of classes   Number of hower of hours    21.1. Lectures   Internal environment, homeostasis, body fluids   2   Acid-base balance   1   Blood   1   Excitability   2   Heart   4   Circulation   4   Metabolism   1   Gastrointestinal tract   6   Kidneys and urinary system   6   Hormones and endocrinal system   4   Reproductive system   2   22.2. Seminars   1   Internal environment, homeostasis, body fluids   1   Acid-base balance   1   Blood   1   Excitability   1   Muscles   2    Heart   2    1   1   1   1   1   1   1   1   1	P_W12 / C_K12	balance of biological processes and physiologic and		
P_U01 / C_S01       stable regulation system (exercise and load tests) and interpret numerical data referring to the basic physiologic variables       B.U.9         P_U02 / C_S02       Can operate simple measures imple measures       B.U.9         P_U03 / C_S03       Can use databases including internet ones and seek for information using available tools       B.U.10         Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake       Number of hours         20. Forms and topics of classes       Internal environment, homeostasis, body fluids       2         Acid-base balance       1         Blood       1         Excitability       2         Muscles       2         Heart       4         Circulation       4         Respiration       4         Metabolism       1         Thermoregulation       6         Gastrointestinal tract       6         Kidneys and urinary system       6         Hormones and endocrinal system       4         Reproductive system       1         Internal environment, homeostasis, body fluids       1         Acid-base balance       1		pathophysiologic changes		
numerical data referring to the basic physiologic variables  P_U02 / C_S02		Can conduct simple functional tests assessing human body as a	B.U	.7
P_U02 / C_S02   Can operate simple measuring instruments and assess the accuracy of performed measures   B.U.9   P_U03 / C_S03   Can use databases including internet ones and seek for information using available tools   Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake   Number of hours    20. Forms and topics of classes   Number of hours    21.1. Lectures   Internal environment, homeostasis, body fluids   2	P_U01 / C_S01	stable regulation system (exercise and load tests) and interpret		
P_U03 / C_S03   Can use databases including internet ones and seek for information using available tools   Can use databases including internet ones and seek for information using available tools   Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake   Sudden verticalization, transition from		numerical data referring to the basic physiologic variables		
P_U03 / C_S03   Can use databases including internet ones and seek for information using available tools   Cu use databases including internet ones and seek for information using available tools   Cu use databases including internet ones and seek for information using available tools   Cu use databases including internet ones and seek for information using available tools   Cu use   Cu u	D 1102 / C 502	Can operate simple measuring instruments and assess the	B.U	.9
P_U04 / C_S04   Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake  20. Forms and topics of classes   Number of hours    21.1. Lectures   Internal environment, homeostasis, body fluids   2	P_002 / C_302	accuracy of performed measures		
P_U04 / C_S04   Can describe changes in body function in disturbance of homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake     Number of hours    20. Forms and topics of classes   Number of hours    21.1. Lectures   Internal environment, homeostasis, body fluids   2	D 1102 / C 502	Can use databases including internet ones and seek for	B.U	.10
P_U04 / C_S04     homeostasis, especially its integrated response to physical effort, exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake       20. Forms and topics of classes     Number of hours       21.1. Lectures       Internal environment, homeostasis, body fluids     2       Acid-base balance     1       Blood     1       Excitability     2       Muscles     2       Heart     4       Circulation     4       Respiration     4       Metabolism     1       Thermoregulation     1       Gastrointestinal tract     6       Kidneys and urinary system     6       Hormones and endocrinal system     4       Reproductive system     2       22.2. Seminars     1       Internal environment, homeostasis, body fluids     1       Acid-base balance     1       Blood     1       Excitability     1       Muscles     2       Heart     2       Circulation     3       Respiration     3       Metabolism     1       Thermoregulation     1       Gastrointestinal tract     1	P_003 / C_303	information using available tools		
exposure to high or low temperature, loss of blood or water, sudden verticalization, transition from sleep to wake  20. Forms and topics of classes    Internal environment, homeostasis, body fluids		Can describe changes in body function in disturbance of	C.U	.20
exposure to nign or low temperature, loss or blood or water, sudden verticalization, transition from sleep to wake  20. Forms and topics of classes    Number of hours	D 1104 / C 504	homeostasis, especially its integrated response to physical effort,		
20. Forms and topics of classesNumber of hours21.1. Lectures	P_004 / C_304	exposure to high or low temperature, loss of blood or water,		
21.1. LecturesInternal environment, homeostasis, body fluids2Acid-base balance1Blood1Excitability2Muscles2Heart4Circulation4Respiration4Metabolism1Thermoregulation1Gastrointestinal tract6Kidneys and urinary system6Hormones and endocrinal system4Reproductive system22.2.2. Seminars1Internal environment, homeostasis, body fluids1Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3		sudden verticalization, transition from sleep to wake		
21.1. LecturesInternal environment, homeostasis, body fluids2Acid-base balance1Blood1Excitability2Muscles2Heart4Circulation4Respiration4Metabolism1Thermoregulation1Gastrointestinal tract6Kidneys and urinary system6Hormones and endocrinal system4Reproductive system222.2. Seminars1Internal environment, homeostasis, body fluids1Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3	20. Forms and topic	s of classes		Number
Internal environment, homeostasis, body fluids         2           Acid-base balance         1           Blood         1           Excitability         2           Muscles         2           Heart         4           Circulation         4           Respiration         4           Metabolism         1           Thermoregulation         1           Gastrointestinal tract         6           Kidneys and urinary system         6           Hormones and endocrinal system         4           Reproductive system         2           22.2. Seminars         1           Internal environment, homeostasis, body fluids         1           Acid-base balance         1           Blood         1           Excitability         1           Muscles         2           Heart         2           Circulation         3           Respiration         3           Metabolism         1           Thermoregulation         1           Gastrointestinal tract         3				of hours
Acid-base balance       1         Blood       1         Excitability       2         Muscles       2         Heart       4         Circulation       4         Respiration       4         Metabolism       1         Thermoregulation       1         Gastrointestinal tract       6         Kidneys and urinary system       6         Hormones and endocrinal system       4         Reproductive system       2         22.2. Seminars       1         Internal environment, homeostasis, body fluids       1         Acid-base balance       1         Blood       1         Excitability       1         Muscles       2         Heart       2         Circulation       3         Respiration       3         Metabolism       1         Thermoregulation       1         Gastrointestinal tract       3	21.1. Lectures			
Blood         1           Excitability         2           Muscles         2           Heart         4           Circulation         4           Respiration         4           Metabolism         1           Thermoregulation         1           Gastrointestinal tract         6           Kidneys and urinary system         6           Hormones and endocrinal system         4           Reproductive system         2           22.2. Seminars         1           Internal environment, homeostasis, body fluids         1           Acid-base balance         1           Blood         1           Excitability         1           Muscles         2           Heart         2           Circulation         3           Respiration         3           Metabolism         1           Thermoregulation         1           Gastrointestinal tract         3	Internal environment	t, homeostasis, body fluids		2
Excitability         2           Muscles         2           Heart         4           Circulation         4           Respiration         4           Metabolism         1           Thermoregulation         1           Gastrointestinal tract         6           Kidneys and urinary system         6           Hormones and endocrinal system         4           Reproductive system         2           22.2. Seminars         1           Internal environment, homeostasis, body fluids         1           Acid-base balance         1           Blood         1           Excitability         1           Muscles         2           Heart         2           Circulation         3           Respiration         3           Metabolism         1           Thermoregulation         1           Gastrointestinal tract         3	Acid-base balance			1
Muscles       2         Heart       4         Circulation       4         Respiration       4         Metabolism       1         Thermoregulation       1         Gastrointestinal tract       6         Kidneys and urinary system       6         Hormones and endocrinal system       4         Reproductive system       2         22.2. Seminars       1         Internal environment, homeostasis, body fluids       1         Acid-base balance       1         Blood       1         Excitability       1         Muscles       2         Heart       2         Circulation       3         Respiration       3         Metabolism       1         Thermoregulation       1         Gastrointestinal tract       3	Blood			1
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Hormones and endocrinal system4Reproductive system222.2. Seminars1Internal environment, homeostasis, body fluids1Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3	Gastrointestinal tract			6
Hormones and endocrinal system4Reproductive system222.2. Seminars1Internal environment, homeostasis, body fluids1Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3	Kidneys and urinary s	system		6
22.2. Seminars1Internal environment, homeostasis, body fluids1Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3			4	
Internal environment, homeostasis, body fluids  Acid-base balance  Blood  Excitability  Muscles  Heart  Circulation  Respiration  Metabolism  Thermoregulation  Gastrointestinal tract  1  1  1  1  1  1  1  1  1  1  1  1  1	Reproductive system			2
Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3			1	
Acid-base balance1Blood1Excitability1Muscles2Heart2Circulation3Respiration3Metabolism1Thermoregulation1Gastrointestinal tract3			1	
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Metabolism1Thermoregulation1Gastrointestinal tract3	Respiration		3	
Thermoregulation 1 Gastrointestinal tract 3	·			
Gastrointestinal tract 3	Thermoregulation			
		t		

Hormones and endocrinal system	4
Reproductive system	2
23.3. Labs	
Orientation class	1
Osmosis, surface tension, diffusion; basic calculations (osmolality, body fluids)	2
Hematocrit; calculations (acid-base balance, blood)	2
Blood typing - ABO and Rh	2
Determining of amount of hemoglobin; different combinations of hemoglobin and oxygen;	2
ECG, electrical axis of the heart, Valsalva maneuver	2
Heart loop analysis; calculations and cases (heart)	2
Blood pressure and arterial pulse measurement; cases (cardiovascular system)	2
Calculations and cases (cardiovascular system)	2
Vital capacity; calculations (respiration)	2
RBC counting; influence of different solutions on erythrocytes; counting of leukocytes,	2
differential white cells counting	2
Class in EaMSC – Virtual Physiology	2
Interactive Physiology	2
Measurement of physical efficiency in humans: Harvard test, Martinet test; Physical work	
capacity (W <sub>170</sub> ); V <sub>O2</sub> max	2
Basal metabolic rate (BMR) measurement; Body mass index (BMI) estimation; Assessment of	2
work load; Water balance	2
ECG - repetition; Heart sounds - repetition; Blood pressure - repetition; Factors influencing	2
arterial blood pressure and heart rate	2
Peripheral circulation: reactions of skin blood vessels, effect of venous congestion;	2
Dermographism; Cases concerning cardiovascular system	2
Cases concerning GIT	2
Respiration - repetition: Vital capacity; Timed vital capacity - normal and after effort;	
Measurement of air peak flow; Voluntary apnea time; Cases concerning respiration	2
Vision: acuity, astigmatism, color blindness, visual field, ambiguous figures, blind spot;	2
Calculations and cases concerning "Kidneys and urinary tract"	2
Unconditioned reflexes in humans; Skin sensation: touch and pain sensation, touch	3
discrimination; Deep sensation examination	2
Cases concerning endocrinal physiology	2
Class in EMSC – Patient Simulator	2
Hearing: auditory fatigue, acuity of hearing, tests acc. to Weber, Rinne, Schwabach;	2
Examination of coordination	2
Problem solving; repetition	1

### 24. Readings

**Physiology** by <u>Linda S. Costanzo</u>

Review of Medical Physiology by William F. Ganong

Color Atlas of Physiology by Agamemnon Despopoulos & Stefan Silbernagl

Physiology labs manual for medical students by Joanna Lewin-Kowalik [Ed.]

## 25. Detail evaluation criteria

In accordance with the recommendations of the inspection bodies Completion of the course – student has achieved the assumed learning outcomes Detail criteria for completion and evaluation of the course are specified in the course regulations