

**AL-FARABI KAZAKH NATIONAL UNIVERSITY**  
**Medicine and Health Care Faculty**  
**Higher School of Medicine**  
**Department of Fundamental Medicine**

**AFFIRM**  
**Dean of the Faculty**  
\_\_\_\_\_ (signature)

**Kalmatayeva Z.A.**

" \_\_\_\_\_ " \_\_\_\_\_ 2023

**EDUCATIONAL AND METHODOLOGICAL COMPLEX OF DISCIPLINE**  
**OMiF1214 Morphology and physiology of human body**

**B086 General medicine**

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**Course – 1**  
**Semester – 2**  
**Number of credits – 8**

**Almaty 2023**

The educational and methodological complex of the discipline was compiled by Nurtaeva G. K., PhD, Mulkiybayeva Sh. Sh., Master of Medicine, Kassanova G. T., Master of Medical Sciences, Nyu M. A., Master of Medical Sciences, Oralkhan Zh., Master of Medical Sciences, Kamzina Z.K. teacher.

Based on the educational program B086 General medicine

Considered and recommended at a meeting of the fundamental medicine department from "\_\_\_" \_\_\_\_\_ 202\_, protocol No. ...

Head of the department \_\_\_\_\_ Sarsenova L.K.  
(signature)

Deputy Director of the HSM for teaching and educational work \_\_\_\_\_ Dzhumasheva R.T.

**AL-FARABI KAZAKH NATIONAL UNIVERSITY**  
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**SYLLABUS**

Spring semester, academic year 2022-2023

**Academic course information**

Discipline's code	Discipline's title	Type	Number of hours per week		Number of credits	ECTS
			Lect.	Pract.		
OMiF1214	Morphology and physiology of human body	BD UC	4	4	8	8
<b>Lecturer, e-mail, contact number</b>	Marina Nyu, <a href="mailto:nyu.marina@med-kaznu.com">nyu.marina@med-kaznu.com</a> , 87074043181 Karchalova Ainur, <a href="mailto:karchalova.ainur@med-kaznu.com">karchalova.ainur@med-kaznu.com</a> , 87479785782 Espolaeva Aikerim, <a href="mailto:yespolayeva.aikerim@med-kaznu.com">yespolayeva.aikerim@med-kaznu.com</a> , 87013488207 Galiya Nurtayeva, PhD, <a href="mailto:nurtayeva.galyia@med-kaznu.com">nurtayeva.galyia@med-kaznu.com</a> , 87014579108				<b>Office hours</b>	According to schedule
<b>Teacher of Histology, e-mail, contact number</b>	Dzhangeldina Zaure, <a href="mailto:dzhangeldina.zaure@med-kaznu.com">dzhangeldina.zaure@med-kaznu.com</a> , 87073469600 Tastan Dinara, <a href="mailto:tastan.dinara@med-kaznu.com">tastan.dinara@med-kaznu.com</a> , 87756005901				<b>Office hours</b>	According to schedule
<b>Teachers of Anatomy and Physiology, e-mail, contact number</b>	Marina Nyu, <a href="mailto:nyu.marina@med-kaznu.com">nyu.marina@med-kaznu.com</a> , 87074043181 Kamzina Zarina, <a href="mailto:kamzina.zarina@med-kaznu.com">kamzina.zarina@med-kaznu.com</a> , 87474815541 Zhaksylykova Manshuk, <a href="mailto:Zhaksylykova.manshuk@med-kaznu.com">Zhaksylykova.manshuk@med-kaznu.com</a> , 87755066773				<b>Office hours</b>	According to schedule
<b>Teachers of Biophysics</b>	Galiya Nurtayeva, <a href="mailto:nurtayeva.galyia@med-kaznu.com">nurtayeva.galyia@med-kaznu.com</a> , 87014579108 Albina Serikbolova, <a href="mailto:serikbolova.albina@med-kaznu.com">serikbolova.albina@med-kaznu.com</a> , 87477041743				<b>Office hours</b>	According to schedule

<b>Academic presentation of the course</b>	<p><b>The aim of discipline</b> is to form integrated knowledge of the normal typical structure and functioning of cells and organs of the human body, taking into account age, sex and individual characteristics, anatomical and topographic relationships and regulation of the functions of cells, organs and systems in normal conditions.</p> <p><b>Learning outcomes of discipline.</b> During the study of the discipline students will learn following aspects:</p> <ol style="list-style-type: none"> <li>1. Know structural and organizational structure of internal organs, localize and describe, using appropriate terminology correctly, on models, preparations and medical imaging materials, the typical structure of internal organs and organs is normal, taking into account age, sex and individual characteristics;</li> <li>2. Understand the functional organization of human body at the systemic, organ and cellular level, the physiological processes of excitable tissues;</li> <li>3. Explain the interrelation of structure and function at the level of tissue, organs and organ systems and the main physiological mechanisms for maintaining homeostasis, vital activity of the organism and their characteristics, taking into account age, sexual and individual differences;</li> <li>4. Recognize microscopic specimens and describe correctly using the appropriate terminology the microscopic structure of human organs, taking into account age, sex and individual characteristics;</li> <li>5. Describe, using appropriate terminology, the stage of human development and explain the basic processes and mechanisms of normal morphogenesis;</li> <li>6. Integrate knowledge about the structure of the musculoskeletal system and internal organs at the systemic, organ and tissue levels and their phylogenetic development in order to understand the anatomical and physiological features in different periods of development in normal conditions</li> <li>7. Demonstrate commitment to the highest standards of professional responsibility and honesty; comply with ethical principles in all professional interactions;</li> <li>8. To demonstrate the need for continuous professional training and improvement of their knowledge and skills;</li> <li>9. To demonstrate the skills of conducting scientific research, the desire for new knowledge and the transfer of knowledge to others</li> </ol>
<b>Prerequisites</b>	OACH1201 The Human Body (medical terminology include)
<b>Post requisites</b>	MiF2203 Normal structure and function of human body
<b>Information resources</b>	<p><b>Basic literature:</b></p> <ol style="list-style-type: none"> <li>1. Saladin, Kenneth S: Anatomy &amp; Physiology. The Unity of Form and Function, 9th Edition (2020, McGraw-Hill Education), ISBN-10 1260571297, 978-1260571295</li> <li>2. Costanzo, Linda S.: BRS Physiology. Board Review Series.7 edition. -Wolters Kluwer Health, 2018.- 307p. - ISBN 1496367693, 9781496367693</li> <li>3. Leslie P. Gartner: Color Atlas and Text of Histology. - 7th Edition. - Wolters Kluwer, 2017. ISBN 1496346734, 9781496346735</li> <li>4. Russell K. Hobbie, Bradley J. Roth: Intermediate Physics for Medicine and Biology. - Springer, 2015. - ISBN 3319126822, 9783319126821</li> </ol>

5. Andersson D, Medical Terminology: The Best and Most Effective Way to Memorize, Pronounce and Understand Medical Terms: Second Edition, ISBN-13 : 978-1519066626, 2016
6. Shoibekova, Alima Zhorabaevna. Latin and Fundamentals of Medical Terminology for Medical Students with Training English [Text] : educational man. / A. Zh. Shoibekova, 2016. - 163, [1] p.
7. Sembulingam, K. Essentials of Medical Physiology [Text] : [monogr.] / K. Sembulingam, P. Sembulingam ; Madha Medical College [et al.]. - 7th ed. - New Delhi ; London ; Philadelphia : Jaypee, 2016. - 1112 p. : il. - Ind.: p. 1069-1112. - ISBN 978-93-85999-11-6

**Additional literature:**

8. Standring, Susan: Gray's Anatomy: The Anatomical Basis of Clinical Practice. - 41 Elsevier Limited, 2016
9. Elaine N. Marieb, Lori A. Smith: Human Anatomy & Physiology Laboratory Manual, Main Version. - 11 edition. - Pearson Education, 2015. - ISBN 9780133999143
10. Scanlon V. C, Essentials of Anatomy and Physiology 8th Edition, F.A. Davis Company, 2018
11. Victor P. Eroschenko, Atlas of Histology with Functional Correlations 13th Edition, LWW, 2017
12. William Bialek: Biophysics: Searching for Principles. -Princeton University Press, 2012. - ISBN 0691138915, 9780691138916
13. Ghosh, Byas Deb. Human Anatomy [Text] : For Students / B. D. Ghosh ; [Anatomical Society of India (West Bengal Chapter) et al.]. - 2nd ed. - New Delhi ; Panama City ; London : Jaypee, 2013. - 948 p. : il. - Ind.: p. 913-948. - ISBN 978-93-5025-942-9
14. Mazumdar, Sibani. Anatomy at a Glance [Text] : An Exam-Oriented Text / S. Mazumdar ; Calcutta National Medical College [et al.]. - 2nd ed. - New Delhi ; London ; Philadelphia : Jaypee, 2014. - 534 p. : il. - Ind.: p. 525-534. - ISBN 978-93-5152-355-0 : App.: p. 519-520. Glossary: p. 521-524.
15. Baktybayeva, Lyaila Kyrgyzbayevna. Base of Physiology [Text] : laboratory practicum / L. K. Baktybayeva, G. T. Zhamanbayeva, M. S. Kulbayeva ; Al-Farabi Kazakh National University. - Almaty : Qazaq University, 2017. - 146 p. : il. - Bibliogr.: p. 145. - ISBN 978-601-04-3138-6

**Online resources:**

1. <https://app.lecturio.com/#/>
2. <https://3d4medical.com/>
3. [https://www.youtube.com/channel/UCc\\_l2c2bUtO0p4DVeo6-Kxg](https://www.youtube.com/channel/UCc_l2c2bUtO0p4DVeo6-Kxg)
4. <https://sites.google.com/a/umich.edu/bluelink/curricula/anatomy-403?authuser=0>
5. <https://histologyknu.wixsite.com/info/gistologicheskie-sajty>
6. <http://www.histology-world.com/contents/contents.htm>
7. <http://www.histologyguide.com/slidebox/02-epithelium.html>
8. <https://histology.medicine.umich.edu/resources>
9. <https://web.duke.edu/histology/>
10. <http://virtuallslides.med.umich.edu/Histology/view.apml?listview=1&>

**Academic policy of the course in the context of university moral and ethical values**

**CLASSES ATTENDANCE**

Students of Al-Farabi Kazakh National University must attend all types of academic sessions in accordance with the approved schedule. It is not allowed to miss classes without an acceptable reason, proved by suitable documents. Students of Al-Farabi Kazakh National University must attend all types of academic sessions in accordance with the approved schedule. It is not allowed to miss classes without an acceptable reason, proved by suitable documents. Students who have missed classes without a valid reason for more than 5 weeks are subject to expulsion from the university for violating the rules of the university's academic policy. Students who do not attend training sessions for more than 5 weeks due to illness must inform their advisor and instruct a trusted person to issue an academic leave for health reasons. If a student misses more than 50% of study sessions on a discipline, he/she is automatically graded "F" ("unsatisfactory") and is not allowed to the final assessment on the discipline.

**ASSESSMENT OF EDUCATIONAL ACHIEVEMENTS OF STUDENTS**

To assess educational achievements of students (achievement of expected learning outcomes), there are following types of control of students' academic performance: – ongoing assessment; – interim examination (RK1,RK2); – midterm examination (MT); – final assessment (final exam). Grade points of the interim examination reflect cumulative total assessment of current academic performance of the student (according to the grades indicated in the attendance list) and results of performance of special tasks of interim examination. The maximum level of academic performance for interim and midterm examinations on the discipline is 100 grade points for each interim examination and for midterm examination, including the results of ongoing assessment. Students who have scored at least 50 grade points ( $IE1 + MT + IE2 / 3$ ) are admitted to the final assessment of their academic performance. The maximum grade for the final exam is 100 grade points. Admission to the examination session is issued by order of the dean of the faculty. It is not allowed to change the results of interim and midterm examinations to increase them. To the final examination are not admitted: – students who scored less than 50 points based on the results of interim examinations and MT ( $IE1 + MT + IE2 / 3$ ); – students who missed more than 50% of classes on the discipline, regardless of documentary evidence; – students who have not submitted term papers (projects) on the relevant discipline; – students studying on contractual basis for provision of educational services, who have debts in payment of tuition fees.

**ASSESSMENT OF LEARNING OUTCOMES, APPEAL, RETAKING OF EXAMS**

Academic achievements of students (knowledge, abilities, skills and competencies) are assessed using the 100-point scale in grade points, corresponding to the internationally accepted alphabetic system with digital equivalents (positive grades, in decreasing order, from "A" to "D" (100-50), and “unsatisfactory” - “FX” (25-49), “F” (0-24), and to the grades of the traditional system. “FX” grade is used only for final examinations. The student, who does not agree with the result of the final assessment on the discipline (grade for the exam), has the right to submit a reasoned written application within three working days after the exam results are published in the electronic records sheet in the Univer system. Application for appeal is accepted, if the grade for the exam does not correspond to the objective level of learning outcomes demonstrated by this student: – due to the incorrect wording of the examination question; – due to the fact that the examination question’s content does not correspond to the study program of the discipline; – due to the fact that the student’s response was assessed incorrectly because of the lack of qualification of the members of examination committee. Appealed grade and reason for the

appeal should be stated in the student's application. In the case of receiving the "unsatisfactory" grade corresponding to the "FX" mark (25-49), the student has the opportunity to retake the final assessment on a paid basis without repeated study of the whole program of the discipline / module. This should be done within the special period of time right after the examination session during which this grade was obtained. If the student gets the "F" grade as a result of re-taking the final exam, he/she should re-register for study of this discipline / module on a paid basis. He/she attends all study sessions, performs all types of academic activities according to the program of the discipline and retakes the final exam. If the student does not appear for a re-taking exam on the discipline for which he/she has been graded "FX", this grade will be transferred to the "F" ("unsatisfactory") and considered an academic debt. Then the student should attend in the next semester on a paid basis all types of study sessions, perform all types of academic work on this discipline according to the program, and take the final exam. Retaking the exam with an "FX" grade is allowed only once. . A student, who violates requirements of the Rules for conducting final assessment (that is using permitted supporting aids, mobile phones, being late for the exam without an acceptable reason, etc.), will get the "F" grade automatically, based on the record of violation, which is not subject to complaint and appeal. In this case, the student should re-study this discipline on a paid basis. In the case of getting the "F" grade, the student has the right to repeat studying the discipline (Retake), but no more than two times. Repeated study of disciplines is carried out only on a paid basis.

THE CODE OF PROFESSIONAL CONDUCT OF STUDENTS OF THE HIGHER SCHOOL OF MEDICINE OF THE FACULTY OF MEDICINE AND HEALTHCARE OF KAZNU, THE CODE OF HONOR OF KAZNU, THE REGULATIONS ON THE STUDENT OF KAZNU

A student of KazNU strictly fulfills his academic duties, does not allow ethical, academic and legal violations, including: plagiarism; forgery; use of cheat sheets, cheating and hints at all stages of various forms of knowledge control; use of family or official ties to obtain a higher grades; bribery; cheating of a teacher and disrespectful attitude towards him; absenteeism and tardiness without a valid reason. A student of KazNU takes care of the safety of the property of KazNU and suppresses vandalism on its territory. In case of illegal actions, appropriate disciplinary penalties will be applied.

**Evaluation and attestation policy**

**Criteria assessment:** assessment of learning outcomes in relation to descriptors, verification of the formation of competencies (learning outcomes specified in the goal) is carried out by the following methods:

- 1) testing using video, drawings, photographs, diagrams, microphotographs or OSPE using models and micropreparations - as part of the current / interim, midterm examination/ final control: final results No. 1, 3;
- 2) solution of situational problems, analysis of cases - within the framework of the current / interim, midterm / final control - final results No. 2, 4, 5, 6, 9;
- 3) interview / oral interview - within the framework of the current / interim, midterm examination / final control - final results No. 2, 4, 5, 6;
- 4) assessment by direct observation in the framework of current control and IWS - final results No. 7, 8, 9;

**Summary assessment:**

In the course, 3 controls (2 interim, 1 midterm examination) are planned, within the framework of which the development of the material is evaluated.

For the semester, admission rating points are set:  $AR = (IE1 + MT \text{ (Mid-Term)} + IE2) / 3$ , where  $IE1 / IE2 / MT$  = the sum of all points for classes + points for interim/midterm examination control and IWS of the corresponding period\*\*.  $IE1$  - 1-5 weeks,  $MT$  - 6-10 weeks,  $IE2$  - 11-15 weeks. The final control (exam) is carried out in 2 stages. The first stage is testing or OSPE\*\*\* (50%), the second stage is an oral survey of tickets (50%). The final grade for the discipline =  $AR * 0.6 + Exam * 0.4$

\*\*AR-admission rating, IE - interim examination, MT - midterm examination, IWS - independent work of student

\*\*\*Objective Structured Practical Exam - students passing stations in the number from 5 to 10 in accordance with the topics submitted for the current / interim/midterm examination/ final controls for a limited time.

### Calendar (schedule) of the implementation of the course content -

**Note:** blue color indicates classes in medical biophysics, yellow color - histology, orange color - current controls, green color - case study

Week	Lesson	Topic title (lectures, practical classes, Independent work of students)	Number of hours (Lecture)	Number of hours (Practical lesson)	Maximum score
1	1.1	Lecture 1 The Functions of Muscles, Muscle Attachments. Functional Groups of Muscles, Innervation and Blood Supply, Muscle Names and Learning Strategy.	1		
	2.1	Practical lesson 1 The Functions of Muscles, Muscle Attachments. Functional Groups of Muscles, Innervation and Blood Supply, Muscle Names and Learning Strategy		1	1,5
	1.2	Lecture 2 Biophysics 1 The Nerve-Muscle Relationship. Behavior of Skeletal Muscle Fibers	1		
	2.2	Practical lesson 2 Biophysics 1 The Nerve-Muscle Relationship. Behavior of Skeletal Muscle Fibers		1	1,5
	3	Lecture 3 Human Histology 1-2 Muscle tissue: smooth and striated skeletal muscle tissue. Nerve tissue. General features of Nerve tissue.	2		



	4	Practical lesson 3 Human Histology 1-2 Muscle tissue: smooth and striated skeletal muscle tissue. Nerve tissue. General features of Nerve tissue.		2	3
		<b>IWST: Consultation on the implementation of case study</b>		2	
2	5	Lecture 4 Behavior of the whole Muscle. Muscle Metabolism	2		
	6	Practical lesson 4 Behavior of the whole Muscle. Muscle Metabolism		2	3
	7	Lecture 5 Muscles of the head and neck	2		
	8	Practical lesson 5 Muscles of the head and neck		2	3
		<b>IWST: Consultation on the implementation of case study</b>		2	
3	9	Lecture 6 Muscles of the Anterior Abdominal Wall; Muscles of the Pelvic Floor; Muscles of the Back. Muscles of Respiration. Muscles Acting on the Hip and Femur, Muscles Acting on the Knee and Leg. Muscles Acting on the Foot, Intrinsic Muscles of the Foot	2		
	10	Practical lesson 6 Muscles of the Anterior Abdominal Wall; Muscles of the Pelvic Floor; Muscles of the Back. Muscles of Respiration. Muscles Acting on the Hip and Femur, Muscles Acting on the Knee and Leg. Muscles Acting on the Foot, Intrinsic Muscles of the Foot		2	3
	11	Lecture 7 Muscles Acting on the Shoulder and Arm; Muscles Acting on the Forearm, the Wrist and Hand	2		
	12	Practical lesson 7 Muscles Acting on the Shoulder and Arm; Muscles Acting on the Forearm, the Wrist and Hand		2	3
		<b>IWST: Consultation on the implementation of case study</b>		2	
4	13	Lecture 8 Human Histology 3-4 Hemopoiesis. General features of Hematopoiesis. Blood. Formed elements: Erythrocytes, leukocytes,	2		

		platelets			
	14	Practical lesson 8 Human Histology 3-4 Hemopoiesis. General features of Hematopoiesis. Blood. Formed elements: Erythrocytes, leukocytes, platelets		2	3
	15	Lecture 9 Introduction, Blood Types. Erythrocytes. Leukocytes.	2		
	16	Practical lesson 9 Introduction, Blood Types. Erythrocytes. Leukocytes.		2	3
		IWSP: Case study - Erythrocytes. Leukocytes.		7	5,5
5	17	Lecture 10 Platelets and Hemostasis, The Control of Bleeding. Interpretation of blood test, coagulogram. Changes in blood system parameters.	2		
	18	Practical lesson 10 Platelets and Hemostasis, The Control of Bleeding. Interpretation of blood test, coagulogram. Changes in blood system parameters. Current control 1		2	43
	19	Lecture 11 Human Histology 5-6 Cardiovascular system. General features of the CVS. Blood vessels. Arteries and veins. Microcirculation stream. Arterioles. Capillaries. Venules.	2		
	20	Practical lesson 11 Human Histology 5-6 Cardiovascular system. General features of the CVS. Blood vessels. Arteries and veins. Microcirculation stream. Arterioles. Capillaries. Venules.		2	3
		<b>IWST: Consultation on the implementation of IWS</b>		2	
6	21 .1	Lecture 12ë Overview of the Cardiovascular System. Gross Anatomy of the heart	1		
	22 .1	Practical lesson 12 Overview of the Cardiovascular System. Gross Anatomy of the heart		1	1,5

	21 .2	Lecture 13 Biophysics 2 Electrical and Contractile Activity of the Heart. ECG	1		
	22 .2	Practical lesson 13 Biophysics 2 Electrical and Contractile Activity of the Heart. ECG		1	1,5
	23	Lecture 14 Cardiac Muscle and the Cardiac Conduction System. Blood flow, heart sounds and cardiac cycle	2		
	24	Practical lesson 14 Cardiac Muscle and the Cardiac Conduction System. Blood flow, heart sounds and cardiac cycle		2	3
		<b>IWST: Consultation on the implementation of IWS</b>		2	
7	25	Lecture 15 Cardiac Output. General Anatomy of the Blood Vessels	2		
	26	Practical lesson 15 Cardiac Output. General Anatomy of the Blood Vessels		2	3
	27 .1	Lecture 16 Human Histology 7. Cardiovascular system. Cardiac Muscle muscle tissue. Heart. Layers of the Heart Wall.	1		
	28 .1	Practical lesson 16 Human Histology 7. Cardiovascular system. Cardiac Muscle muscle tissue. Heart. Layers of the Heart Wall. Current control 1.		1	14
	27 .2	Lecture 17 Biophysics 3 Blood pressure, resistance and flow	1		
	28 .2	Practical lesson 17 Biophysics 3 Blood pressure, resistance and flow		1	1,5
		<b>IWST: Consultation on the implementation of IWS</b>		2	

		<b>Interim Examination-1</b>			<b>100</b>
<b>8</b>	29	Lecture 18 Capillary Exchange. Regulation of blood pressure and flow.	2		
	30	Practical lesson 18 Capillary Exchange. Regulation of blood pressure and flow.		2	3
	31	Lecture 19 Venous Return and Circulatory Shock. Special Circulatory Routes. Anatomy of the Pulmonary Circuit	2		
	32	Practical lesson 19 Venous Return and Circulatory Shock. Special Circulatory Routes. Anatomy of the Pulmonary Circuit.		2	3
		<b>IWST: Consultation on the implementation of IWS</b>		2	
<b>9</b>	33	Lecture 20 Human Histology 8-9 Lymphoid system. General features of the Lymphoid system. Thymus. Lymph Nodes. Spleen.	2		
	34	Practical lesson 20 Systemic Vessels of the Axial Region		2	3
	35 .1	Lecture 21 The lymphatic and immune system.	1		
	36	Practical lesson 21 Systemic Vessels of the Axial Region		2	3
	35 .2	Lecture 22 Biophysics 4 Biophysics of the nervous system Electrophysiology of neuronal synapses. Biophysics of the neural integration of the nervous system	1		
	<b>IWST: Consultation on the implementation of IWS</b>		2		

10	37	Lecture 23 Human Histology 10-11 Histology of the supporting cells of the nerve tissue (neuroglia). Histology of the Nervous System Peripheral Nervous System. Ganglia. Spinal cord.	2		
	38	Practical lesson 22 Anatomy of the Systemic Vessels of the Appendicular Region		2	3
	39	Lecture 24 Overview of the Nervous System. Properties of Neurons. Supportive Cells (Neuroglia). Synapses. Neural Integration	2		
	40	Practical lesson 23 Anatomy of the Systemic Vessels of the Appendicular Region. CC2		2	23
		<b>IWST: Consultation on the implementation of IWS</b>		2	
11	41	Lecture 25 Overview of the Nervous System. Properties of Neurons. Supportive Cells (Neuroglia). Synapses. Neural Integration	2		
	42	Practical lesson 24 Human Histology 8-9 Lymphoid system. General features of the Lymphoid system. Thymus. Lymphoid system. Lymph Nodes. Spleen.		2	3
	43	Lecture 26 Spinal cord. Somatic reflexes.	2		
	44 .1	Practical lesson 25 The lymphatic and immune system.		1	1,5
	44 .2	Practical Lesson 26 Biophysics 4 Biophysics of the nervous system Electrophysiology of neuronal synapses. Biophysics of the neural integration of the nervous system		1	1,5
	<b>Presentation of IWS “Anatomical Patterns of Superficial Cubital Veins”</b>		7	5	
12	45	Lecture 27 Human Histology 12 Histology of the nervous system Central nervous system. Brain. Cortex. Cerebellum. Overview of the meninges, ventricles, cerebrospinal fluid and blood supply	2		

	46	Practical Lesson 27 Human Histology 10-11 Histology of the supporting cells of the nerve tissue (neuroglia). Histology of the Nervous System Peripheral Nervous System. Ganglia. Spinal cord.		2	3
	47	Lecture 28 Spinal Nerves	2		
	48	Practical Lesson 28 Overview of the Nervous System. Properties of Neurons. Synapses. Neural Integration. Spinal cord.		2	3
		<b>IWST: Consultation and feedback on difficult topics</b>		2	
13	49	Lecture 29 Overview of the meninges, ventricles, cerebrospinal fluid and blood supply. Midbrain.	2		
	50	Practical Lesson 29 Somatic reflexes. Spinal Nerves		2	3
	51	Lecture 30 Hindbrain. Forebrain.	2		
	52	Practical lesson 30 Human Histology 12 Histology of the nervous system Central nervous system. Brain. Cortex. Cerebellum. Overview of the meninges, ventricles, cerebrospinal fluid and blood supply. Current control 2.		2	8
		<b>IWST: Consultation and feedback on difficult topics</b>		2	
14	53	Lecture 31 Integrative functions of the brain	2		
	54	Practical Lesson 31 Overview of the meninges, ventricles, cerebrospinal fluid and blood supply. Midbrain. Hindbrain. Forebrain.		2	3
	55	Lecture 32 Integrative functions of the brain	2		

	56	Practical Lesson 32 Integrative functions of the brain		2	3
		<b>IWST: Consultation and feedback on difficult topics</b>		2	
<b>15</b>	57	Lecture 33 Cranial Nerves I	2		
	58	Practical Lesson 33 Cranial Nerves I		2	3
	59	Lecture 34 Cranial Nerves II	2		
	60	Practical Lesson 34 Cranial Nerves II. CC3.Recap: case study (capstone case)		2	25
		<b>IWST: Consultation and feedback on difficult topics</b>		2	
		<b>Interim Examination 2</b>			<b>100</b>