**Anatomy and Physiology of**

**Central Nervous System and Complex Nervous Activity**

**PSY127**

ID 2942

**Spring 2023**

**Instructor:**  Gulnara Kurmanova, PhD

**Office:** Psychology Department

**Course time:**

Lecture: Tuesday 09:25 - 10:40

Seminar: Thursday 09:25 - 10:40

**Credit hours:** 6

**Course status:** Elective

**Office hours:** Tuesday 11:00 – 12:00

Thursday 11:00 – 12:00

**Pre-requisites:** No pre-requisites

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**Phone:** 663309

**Enrollment Key:** PSY127

Room: 203 (tbc)

**Required textbooks:**

1. **Main textbook:** Noback Ch.R. et al.,*The Human Nervous System. Structure and Function*, 6th edition, 2005 (**downloaded** at e-course).

**Textbooks:**

1. H. J. ten Donkelaar, *Clinical Neuroanatomy*, https://doi.org/10.1007/978-3-030-41878-6\_14 (recommended chapters are **downloaded** at e-course)
2. Carlson, N. (2007). *Physiology of Behavior,* 9th edition
3. Gazzaniga, M & et al (1998). Cognitive neuroscience; the biology of mind. NY. P.550 (available in our library)

**Course description**

This intensive terminology-heavy course encompasses the overview of the biological functioning and mechanisms of the human central nervous system, starting with the examination of the structural units and their functions and with further insight into physiological aspects of both normal and abnormal CNS activity.

From the human anatomy perspective, we will study the nervous system and the structure of the brain, and analyze various tissues and organ systems within CNS in accordance with their functions. We will study biological systems, tissues, and cells, the mechanisms and principles of their interaction with each other and the outer environment. Thus, you will learn about neuron development and plasticity, neurobiological systems, such as the sensory and motor systems, and the neural mechanisms of such complex phenomena, as emotions, memory, and cognition.

**Objectives:**

The main goal of the course is to provide students with an opportunity to examine the structural and functional features of the human nervous system and higher nervous activity in the pursuit of a deeper understanding of the biological basis of human behavior.

* You will be able to identify most important structures of the CNS and describe their functions in the context of modern psychology;
* You will be able to read professional literature based on knowledge of the anatomy and physiology of the CNS
* You will understand both classical and contemporary research methodology used for CNS studies;
* You will be able to explain some key neurobiological structures and mechanisms underlying higher behavioral functions, such as language, emotion, learning, as well as those involved in psychopathological states.

The course includes a series of tasks to depict the structures of the brain. You can use any image technique.

**Resources to Support Student Learning:**

* Library Help, eReserves and research tools: <https://library.auca.kg/>
* Writing Center: <https://warc.auca.kg/>
* Academic Advising Office: <https://auca.kg/en/academic_advising/>
* Psychological Counseling Services: <https://auca.kg/en/psycons/>
* AUCA Student Code of Conduct <https://auca.kg/uploads/Students_life/Docs/Code%20of%20Students%202019.pdf>
* AUCA Bylaws of the Academic Appeals Committee <https://auca.kg/uploads/Faculty%20Senate/Academic%20Appeals%20Committee%20Bylaws.pdf>
* Accommodation policy (for students with special educational needs) <https://auca.kg/en/p5732652484/>

**Academic Honesty**

Students are expected to follow the AUCA Academic Honesty code. All types of plagiarism are strictly prohibited. “Papers may appear to be plagiarized if students: occasionally use the words of another scholar without quotation marks and proper reference, with the result that it appears that the words are the student’s own; occasionally use the ideas of another scholar without proper reference; inadequately paraphrase the words or ideas of another scholar; or fail to include the bibliographic citation for all sources used in the process of completing the assignment. Self-plagiarism is also dishonest, it is not appropriate to hand in the same work for assignments given in more than one class, without the permission of every instructor”.

If a student fails to observe this requirement, the instructor may assign an “F” for the work or an “F” for the whole class, depending on the type of assignment and relevant circumstances. Students are expected to read and follow the section on Student Academic Dishonesty of the AUCA Code of Student Rights, Responsibilities and Conduct.

* On the first occasion you are caught plagiarizing, you fail that assignment.
* The second time, you fail the course.
* The third time, you may be subject to more severe penalties.

The Registrar, your academic advisor, and the FYS Director will all be informed of your plagiarism. You will also be required to arrange a session with a WARC tutor, who will review your paper with you and help you avoid making the same mistake in the future.

**Course rules and regulations**

**Documents, devices and on-line policy.** The use of mobile phones and laptops to connect

to the Internet for learning tasks is encouraged. Please, put mobile phones into silent mode. Please keep all your written work on your computer or in the cloud until final grading.I also expect the student to be able to use the Tracking > Track Changes option of the Word app.

**Individual program.** In exceptional cases, for academical reasons and for students showing excellent academic progress, it is allowed to take a course on an individual program. In this case, the student does the same work as everyone else, but contacts me at a designated time.

**Review the course requirements carefully**. This syllabus may change slightly to accommodate unforeseen events.

**Please, keep track of your points and grade in e-course**, so, later on, you will not be surprised by your final grade.

**Communication with me is best via email** at [kurmanova\_g@auca.kg](mailto:kurmanova_g@auca.kg) . As a rule, I answer your emails in 24 hours, except weekends and holidays. If you didn’t get my reply timely, please, contact me personally via phone or Whatsapp. Also, make sure my emails don't end up in your spam folder.

**JIT rule.** For this course, the Just In Time rule works. Here it means that your papers submitted after deadline or not via the e-course will not be evaluated. The same about your presentations.

**Course requirements:**

1. **Attendance and participation – 20%**. Students who take notes, ask questions, respond to questions, and meet the instructor for discussions are typically the ones who succeed in this class. I strongly recommend you attend class prepared. If you do happen to miss a class, that’s OK, but you will be responsible for *all* material covered in lecture or seminar, some of which will not be covered by the textbooks. If you know about an absence beforehand, please send me an email to let me know. **X-grade** specifically denotes non-attendance; (a) X grade cannot be requested by students and is only given at the discretion of a faculty member; (b) X grade should not affect the GPA. Receiving an X grade for the same course twice, results in an automatic F grade for that course. Students gain bonus points (up to 5, for the whole course) for the active participation in the class.
2. **Quizzes, class and homework – 20%.** I use quizzes to help students memorize key concepts and facts, evaluate the understanding of the course materials, and to help prepare for final exams. Tests include multiple-choice questions. There will be some in-class and take-home tasks throughout the semester. Students who miss class are responsible for getting the information about the home assignment.
3. **Presentations – 20%**. During the semester, each student will do one 20-25 minutes presentations (10 %) followed by a facilitated discussion (5-10 minutes). The goal of the oral performance is to provide with clear understanding of the chapters’ main topics and readings. Also, in the middle of course, four group presentations are planned (10 %).

General criteria of evaluation of the presentation are:

* It presents a problem or a case in a clear and well-structured manner, clearly establishes connections between biological structures and functions and the discussed psychological phenomena (**5 points**),
* Includes all the necessary sections (see “How to construct your presentation”, **2 points**),
* Is uploaded on e-course before in-class presentation (**1 point**),
* Does not contain direct borrowings from other presentations (**1 point**),
* Causes an active meaningful discussion, and the presenter prepared at least two open-ended questions (**1 point**).

1. **Midterm exam - 20%.** The exam will cover the assigned readings and lectures for preceding materials and will consist of multiple-choice questions. If you forget about midterm exam, you will have no another opportunity to pass it. If you were sick, please provide a medical certificate. and you will be able to take the exam at the time I set. In this case, the exam will be oral or in written form.
2. **Final exam - 20%.** The Final Exam will be in the same form as the Midterm, but I can add some additional assignments also.

**Grading**

Grades will be based on a total of 100 points. If you would like to discuss your grades, tell me.

**Attendance** 20 points

**Homework** 20 points

**Class work** 20 points

**Midterm Exam** 20 points

**Final Exam** 20 points

If a student does not miss classes, performs class and homework on time and with excellent quality, asks good questions and gives meaningful answers, has higher scores for quizzes and midterm, and also brings new interesting elements into the educational process, the lecturer can evaluate his success with the highest score without final exam.

If you feel that the evaluation of your work was not fair or you noticed some scoring mistakes in your grade, tell me. If your demands are reasonable, the grade will be reconsidered.

As your final exams ended and exams and papers are being graded, please be reminded that grade negotiations are not acceptable at AUCA. You may contact me one time and receive feedback for why you received the grade so that you can perform better in the future. However, you should have no expectation that the grade will be changed. Repeatedly contacting professors with a request of grade change may be considered as grounds for sanction under the anti-harassment policies.

I carefully evaluate your work based on your performance throughout the semester, and my evaluations should be respected. If you think there are objective reasons to disagree with your grade you may follow the rules of the formal grade appeal process after the grades are posted.

A grade of **Incomplete** is reserved for only those special cases when a student has missed a significant portion of the semester's work because of health issues or other unavoidable circumstances.

**0 ≤ F ≤ 45 < D- ≤ 50 < D ≤ 55 < D+ ≤ 60 < C- ≤ 65 < C ≤ 70 < C+ ≤75 < B- ≤ 80 < B ≤ 85 < B+ ≤ 90< A- ≤ 95 < A ≤100.**

**Class schedule**

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| **Date** | **Topic** | **Reading** | **Seminar** |
| **Week 1**  Jan 17, 19 | Gross Anatomy NS | Noback Ch.1 Gross Anatomy of the Brain | Main parts of brain |
| **Week 2**  Jan 24, 26 | Neurons and Associate Cells | Noback Ch.2 Neurons and Associate Cells | Presentations:  1.Acrania and Hydrocephaly.  2.Disorders of myelination. |
| **Week 3**  Jan 31, Feb 02 | Communication between neurons | Noback Ch.3 Basic Neurophysiology | Presentations:  1.Neurotransmitters’ role in drug dependence  2.Acetylcholine: Neurotransmitter of learning and memory |
| **Week 4**  Feb 07, 09 | Brain protection | Noback Ch.4 Blood Circulation, Ch.5 Meninges and CSF | Presentations: 1.Meningitis  2.Blood Circulation |
| **Week 5**  Feb 14, 16 | Brain development | Noback Ch.6 Development | Presentations: 1.Apoptosis  2.Critical Periods of Brain Development |
| **Week 6**  Feb 21 | Spinal cord | Noback Ch.7 The Spinal Cord, Ch.8 Reflexes, Ch.12 Lesions | No seminar |
| **Week 7**  Feb 28, Mar 02 | Cerebellum | Noback Ch.18 The Cerebellum | Midterm |
| **Week 8**  Mar 07, 09 | Brainstem | Noback Ch.13 The Brainstem, Ch.17 Lesions Brainstem | Presentations:  1.Spinal cord lesions. Spina Bifida.  2.Spinal Reflexes |
| **Week 9**  Mar 14, 16 | Sensory systems: Pain and Proprioception (Group presentations) | Noback Ch.9 Pain and Temperature, Ch.10 Proprioception | Presentations: 1.Cerebellar Ataxia and Dysarthria2. Cerebellum Influences Addictive and Social Behavior |
| **Week 10**  Mar 28, 30 | Sensory systems:  Auditory and Visual Systems (Group presentations) | Noback Ch.14 Auditory System, Ch.10 Visual System | Presentations: 1.Brainstem: Reticular Activating System  2.Blue Spot and Alzheimer’s disease |
| **Week 11**  Apr 04, 06 | Limbic system | Noback Ch.22 Limbic system | Presentations:  1.The concept of “Three Brains”  2.Anatomy and physiology of srtess(hypothalamic–pituitary–adrenal axis) |
| **Week 12**  Apr 11, 13 | Diencephalon. Thalamus | Noback Ch.23 Thalamus | Presentations:  1.Fatal family insomnia and Creutzfeldt-Jacob disease.  2.**Korsakoff and Wernike syndromes.** |
| **Week 13**  Apr 18, 20 | Hypothalamus | Noback Ch.21 Hypothalamus | Presentations:  1.Hypothalamus, anorexia, obesity. 2.Hypothalamus and Sexual Expression. |
| **Week 14**  Apr 25, 27 | Basal Ganglia | Noback Ch.24 Basal Ganglia | Presentations:  1.Parkinson Disease and Huntington Chorea  2.Fahr’s disease |
| **Week 15**  May 02, 04 | Cortex | Noback Ch.25 Cortex | Presentations:  1.Cortex and Language. Anatomy and physiology of aphasias.  2. The Neuroanatomy of ASD |
| **Week 16**  May 11 | No lecture | No reading | General Q&A Session |
| **Week 17**  May 16 | Final Exam |  |  |