

**Ministry of Education and Science of Ukraine
Lesya Ukrainka Volyn National University
Department of General and Clinical Psychology**

**SYLLABUS
of
Basic Course**

Foundations of Cognitive Science

Syllabus for Ph.D. students

Speciality C4 Psychology

Education Program “Personality Psychology: Genesis, Health, Safety”

Syllabus of Basic Course “Foundations of Cognitive Science” for Ph.D. students. Speciality C4 Psychology. Education Program “Personality Psychology: Genesis, Health, Safety”

Author: Zasiékina, Larysa, Doctor of Science in Psychology, Professor

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Approved at the meeting of the Department of General and Clinical Psychology (№1, 28.08.2025)
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I. Description of the discipline

1.1. Full-Time study

Name of indicators	Field of knowledge, speciality, educational and scientific program, educational level	Course description
Full-time education	For all educational and scientific programs	Basic course
Number of hours / credits 150/ 5	Doctor of Philosophy	Year of study <u>2</u>
Individual research assignment: <u>no</u>		Semester <u>3</u>
Language of instruction		Lectures <u>30</u> hours.
		Practical (seminar) <u>20</u> hours
		Laboratory hours
		Individual hours
		Independent work <u>91</u> hours.
		Form of control: exam/credit
		English

II. Information about lecturer

Lecturer: Larysa Zasiékina
Degree: Doctor of Science in Psychology
Academic Rank: Professor
Position: Vice-Rector for Research and International Affairs, Lesya Ukrainka Volyn National University

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III. Course description

1. The course “Fundamentals of Cognitive Science” belongs to the cycle of basic course of general education of a PhD students, is studied in the 3rd and 4th semester, the form of control is an exam and a test. 4/3 of the credits (150 hours) are allocated for the study of the academic discipline, including: full-time study – 30 hours of lectures, 20 hours of seminars, 81 hours – independent work; Consultation – 9 hours.

The course is aimed at analyzing and studying the basic principles of cognitive science. The syllabus is based on a systematic approach to the training of modern scientists and a competency-based approach to determining the quality of training of applicants for the third (educational and scientific) level of higher education, able to work in accordance with modern requirements.

1. Prerequisites:

- *Interactive learning technologies*

2. The purpose of teaching the discipline course “Fundamentals of Cognitive Science” is the formation of PhD students a holistic system of knowledge and skills related to the theory and methodology of educational activities of educational institutions, as well as the system of professional development, readiness to improve their professional level, increase the level of the ethical interaction with students, the formation of a positive orientation, empathy, reflection.

There are *five course objectives*.

1. Understand the historical roots of cognitive science.
2. Understand the nature of human intelligence and how the study of the brain has revealed about normal and abnormal human intelligence.
3. Understand the historical roots of computing and artificial intelligence.
4. Analyze how the evolution of biological intelligence in humans and other species may have occurred.
5. Analyze how the prevalence of machine learning and automation might change work by humans in the future.

4. The course is aimed at the formation of the following competencies:

General competence (GC-1). Ability to design and conduct comprehensive research on the basis of systematic philosophical knowledge of the principles and tools of modern scientific knowledge, its socio-cultural conditionality and multidisciplinary nature.

GC-2. Ability to critically analyze and evaluate modern research, generate new ideas in solving research and practical tasks, complex and innovative issues.

GC-4. Readiness for creation and interpretation new knowledge through research or other advanced education of such quality that meet the requirements of national and international levels, to work in international research groups.

GC-6. Ability to self-management, planning and solving issues of one's own professional and personal growth.

Professional competencies

PC1. Ability to perform theoretical, methodological and empirical analysis of current issues of Psychological Science and/or practice.

PC3. Ability to select and apply valid and reliable research methods and/or evidence-based methods and techniques.

PC5. Ability to interact effectively with colleagues in mono- and multidisciplinary teams.

PC6. Ability and preparedness to take responsibility for students' decisions within professional competence, including risk situations, to make non-standard decisions in difficult situations, achieving their implementation.

PC7. Ability and preparedness to adapt to new situations, re-evaluate the experience, analyze their professional capabilities, readiness for active professional mobility.

PC8. Ability to assess the own professional competence and improve professional skills.

PC9. Ability to develop projects independently through creative application of existed and new ideas.

The Course Structure

Names of content modules and topics	Total ¹	Lectur es	Seminars	Individ ual work	Methods and techniques of teaching ²	Form of control ³ / Rat
Content module 1. What is Cognitive Science?						
Theme 1. Introduction to Cognitive Science	14	2	2	8	Team-based learning	i/tRat tests
Theme 2. Explanation and Simulation in Cognitive Science	16	4	2	8	Team-based learning	i/tRat tests
Total for module 1	30	6	4	16	-	i/tRat tests -
Content module 2. Cognitive Psychology: The Architecture of the Mind.						
Theme 3. The Architecture of the Mind: Modularity and Modularization	14	4	2	8	Team-based learning	i/tRat tests
Theme 4. Surfaces, Objects, and Faces.	16	4	2	9	Team-based learning	i/tRat tests
Total for module 2	30	8	4	17	-	i/tRat tests
Content module 3. Artificial Intelligence.						
Theme 5. Artificial Intelligence: Knowledge Representation.	16	2	2	10	Team-based learning	i/tRat tests
Theme 6. Artificial Intelligence: Search, Control, Learning.	16	2	2	10	Team-based learning	i/tRat tests
Total for module 3	32	4	4	20		
Content module 4. Artificial Intelligence: Search, Control, Learning.						
Theme 7. Introduction to the Study of the Nervous System	16	2	2	10	Team-based learning	i/tRat tests
Total for module 4	16	2	2	10	Team-based learning	i/tRat tests
Content module 5. Linguistics: The Representation of Language.						
Theme 8. Producing and Perceiving Speech.	14	4	2	10	Team-based learning	i/tRat tests
Theme 9. How Many Roots of Reading?	14	4	2	10	Team-based learning	i/tRat tests
Theme 10. Natural Language Processing	14	2	2	8	Team-based learning	i/tRat tests
Total for module 5	42	10	6	28		
Types of final thesis (for needs)						Points
Team Project						70

Total hours/ Points	150	30	20	91	-	100
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Notes: ¹ / Full-time education/ part-time form of education; ² /i/tRat tests – individual/readiness assurance test for team-based learning

Expected program-learning outcomes: PO 1. To search, process and analyze professionally important knowledge from various sources using modern information and communication technologies.

PO2. Be able to organize and conduct psychological research using valid and reliable methods.

PO3. Develop educational papers and educational programs, implement them, receive feedback, and evaluate quality.

PO4. Understand the purpose of professional and personal development, assessing their own potential abilities, selected ways and means of solving tasks.

PO6. Summarize the results of own research in the form of various scientific reports (abstracts, articles, reports, presentations).

3. Tasks for independent work:

Theme 1. Cognitive vs Discursive Revolution– 5 hours.

Theme 2. Cognitivism and Computer Metaphor 5 hours.

Theme 3. Connectionism and Human Brain – 5 hours.

Theme 4. Hybrid Models – 5 hours.

Theme 5. Representation of Knowledge: Frames, Frame Analysis – 5 hours.

Theme 6. Representation of Knowledge: Scripts, Script Analysis – 5 hour.

Theme 7. Representation of Knowledge: Schema, Schema Analysis – 5 hours.

Theme 8. Processing Information – 5 hours.

Theme 9. Cognitive operations of information perception – 5 hours.

Theme 10. Cognitive operations of information interpretation– 5 hours.

Theme 11. Cognitive operations of information interpretation – 5 hours.

Theme 12. Conceptual system and its structure – 5 hours.

Theme 13. Mental lexicon and its structure. – 5 hours.

Theme 14. Neurocognition – 5 hours.

Theme 15. Metacognition – 5 hours.

Theme 16. Cognitive and Neurocognitive Science: Prospects – 11 hours.

To determine, taking into account the specific educational environment, the pedagogical conditions for ensuring the technology of professional and communicative competence formation is required.

IV. Evaluation policy

Attending classes gives the opportunity to obtain the declared integral, general and professional competencies, to perform tasks in a timely and high-quality manner.

For conscious and systematic mastering of the course it is necessary systematic educational and cognitive work of PhD students in all types and forms of its organization: lectures, practical classes, consultations, independent work.

The control of PhD students' success is carried out taking into account the current and final assessment. Classroom classes are mainly held in the form of team-based learning, namely pre-class activities, individual/team readiness assurance tests, clarification session, application session and peer evaluation.

At the classes, PhD students present a draft model of formation of professional and communicative competence.

The assessment is carried out on a 100-point scale.

The number of points for working with theoretical papers at application sessions, during the independent work execution depends on compliance with the following requirements: timeliness of educational tasks; the full scope of their implementation; quality of educational tasks; independence of

execution; creative approach to tasks; initiative in educational activities.

The following requirements are:

current control – a multimedia presentation of the task on the topic provided by the syllabus. The maximum number of points on each topic (4 points) can be obtained by multimedia presentation of the task and the independent work completion. Current control – a maximum of 70 points;

module control is conducted in the form of a project presentation – a maximum of 30 points.

Attendance of practical classes is mandatory. Under the circumstances of forced distance learning during COVID-19, education can also take place online (in agreement with the Postgraduate Research Degree Unit).

Informal Learning. Attendance of the **International internet conference on recent advances in Cognitive Psychology (ICRACP), National University “Ostroh Academy”** 10 points, participation in the **International internet conference on recent advances in cognitive psychology (ICRACP), National University “Ostroh Academy”** 20 points, participation and publishing thesis in the **International internet conference on recent advances in Cognitive Psychology (ICRACP), National University “Ostroh Academy”** 30 points which are accommodated to module control points.

Academic Integrity: The completed assignments of PhD students must be their original research or reasoning. Lack of references to sources used, fabrication of sources, write-offs, interference in the work of others are examples of possible academic dishonesty. Detection of signs of academic dishonesty in the PhD student`s written work is the basis for its non-enrollment, regardless of the extent of plagiarism or deception.

Deadline and rescheduling policy: papers that are submitted in violation of deadlines without good reason are evaluated at a lower grade (-1 point). Rescheduling takes place with the permission of the Postgraduate Research Degree Unit of LUVNU within good reasons. Received certificates of professional development, participation in webinars, etc., the topic of which corresponds to the education course are credited as: 6-15 hours as a speech on 2 practical classes; 15-30 hours – as MCW.

V. Final control

The curriculum provides for credit (3th semester) and exam (4th semester) . The credit can be set based on the results of the current and final control. If the Phd student wants to improve the result, he passes a credit.

The credit is conducted in the form of a written test. PhD students are offered test tasks in the amount of 30 questions. The maximum score for the test is 60 points.

Types of test tasks:

- with the choice of one correct answer;
- with a choice of several correct answers;
- to establish the correspondence of the proposed sets of statements;
- the task of reproducing the correctness of the answer (formulations of concepts) on memory;
- open-ended task, which provides a detailed answer.

VI. Rating scale

Score in points for all kinds of educational activity	Rating	
	For the exam	For the credit
90 – 100	Excellent	Accept
82 – 89	Very good	Accept
75 - 81	Good	Accept
67 -74	Satisfactory	Accept
60 - 66	Sufficiently	Accept
1 – 59	Unsatisfactory	Unsatisfactory (with the option to take

VII. LIST OF SOURCES:

ESSENTIAL LITERATURE in Ukrainian (at Lesya Ukrainka VNU Library)

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2. Пасічник І., Каламаж Р., Матласевич О., Нікітчук У. Психологія мислення : підручник / за ред. І. Пасічника. Острого: Острозька акад., 2015. 560 с.

Essential literature

1. Collins, A., & Bobrow, D. G. (Eds.). (2017). Representation and understanding: Studies in cognitive science. Elsevier.

2. Dancygier, B. (Ed.). (2017). The Cambridge handbook of cognitive linguistics. Cambridge University Press.

3. Gonzalez, C. (2017). Decision-making: a cognitive science perspective. *The Oxford handbook of cognitive science, 1*, 1-27.

4. Kitajima, M. (2020). Cognitive Science Approach to Achieve SDGs.

5. Levy, N., & Ross, R. M. (2021). The cognitive science of fake news. In *The Routledge Handbook of Political Epistemology*, 181-191.

6. Noveck, I. (2018). Experimental pragmatics: The making of a cognitive science. Cambridge University Press.

7. Palestro, J. J., Sederberg, P. B., Osth, A. F., Van Zandt, T., & Turner, B. M. (2018). Likelihood-free methods for cognitive science. Springer.

8. Shea, N. (2018). Representation in cognitive science. Oxford University Press, 304.

9. Smith, P. J., & Hoffman, R. R. (Eds.) (2017). Cognitive Systems Engineering: The Future for a Changing World. Crc Press.

10. Van Eyghen, H., Peels, R., & Van den Brink, G. (2018). New Developments in the Cognitive Science of Religion. London: Springer.

Additional literature

1. Bogaerts, L., Frost, R., & Christiansen, M. H. (2020). Integrating statistical learning into cognitive science. *Journal of Memory and Language*, 115, 104167.

2. Cohn, N., & Magliano, J. P. (2020). Editors' introduction and review: Visual narrative research: An emerging field in cognitive science. *Topics in Cognitive Science*, 12(1), 197-223.

3. Colombo, M., & Hartmann, S. (2017). Bayesian cognitive science, unification, and explanation. *The British Journal for the Philosophy of Science*, 68(2), 451-484.

4. Favela, L. H., & Martin, J. (2017). "Cognition" and dynamical cognitive science. *Minds and Machines*, 27(2), 331-355.

5. Gallagher, S. (2018). Rethinking nature: Phenomenology and a non-reductionist cognitive science. *Australasian Philosophical Review*, 2(2), 125-137.

6. Greenland, S. (2017). Invited commentary: The need for cognitive science in methodology. *American journal of epidemiology*, 186(6), 639-645.

7. Laird, J. E., Lebiere, C., & Rosenbloom, P. S. (2017). A standard model of the mind: Toward a common computational framework across artificial intelligence, cognitive science, neuroscience, and robotics. *Ai Magazine*, 38(4), 13-26.

8. Lewandowsky, S. (2020). The 'post-truth' world, misinformation, and information literacy: A perspective from cognitive science. *Informed societies—Why information literacy matters for citizenship, participation and democracy*, 69-88.

9. Litwin, P., & Miłkowski, M. (2020). Unification by fiat: arrested development of predictive

processing. *Cognitive Science*, 44(7).

10. McKinney, J. (2021). The Philosopher's Path to San José: Toward a Cross-Cultural Radical Embodied Cognitive Science. *Humanities Center Booklet*, (9), 40-72.

11. Nave, K., Deane, G., Miller, M., & Clark, A. (2020). Wilding the predictive brain. *Wiley Interdisciplinary Reviews: Cognitive Science*, 11(6), e1542.

12. Núñez, R., Allen, M., Gao, R., Rigoli, C. M., Relaford-Doyle, J., & Semenuks, A. (2019). What happened to cognitive science?. *Nature human behaviour*, 3(8), 782-791.

13. Prystawski, B., Mohnert, F., Tošić, M., & Lieder, F. (2020). Resource-rational Models of Human Goal Pursuit. *Topics in Cognitive Science*.

14. Stewart, N., Chandler, J., & Paolacci, G. (2017). Crowdsourcing samples in cognitive science. *Trends in cognitive sciences*, 21(10), 736-748.

15. Taylor, S. D. (2021). Two kinds of explanatory integration in cognitive science. *Synthese*, 198(5), 4573-4601.