

Syllabus for the course «Introduction to Cognitive Science»

Approved
MP Academic Council
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1. Course Description

a. «Introduction to Cognitive Science»

b. **Pre-requisites**

None

c. **elective**

d. **Abstract**

Cognitive psychologists have been exploring the human mind through behavioral studies for over fifty years. In parallel, neuroscientists have built-up our understanding of the human brain. Cognitive Science lies at the intersection of these fields, asking some of the toughest but most fascinating questions in science: How are memories stored in the brain? Is our brain pre- prepared to learn language? How does the average human brain outperform many face recognition algorithms? What is the role of sleep in cognition? We will explore these and many other questions in this course. As well as being interesting in its own right, Cognitive Science is also having an increasing impact on our lives, such as through the developing field of ‘brain reading’ with brain scanners, or new devices that can change our brain’s activity at the push of a button. Through learning about the techniques used by cognitive neuroscientists and reading studies first-hand, it is hoped that students will come away with an understanding of this cutting-edge field and the mysterious lump of tissue within their own head. The author of the course Elena Gorbunova is a professor of National Research University Higher School of Economics.

2. Learning Objectives

The main goal of this course is to introduce students into basic concepts of cognitive science, the basic methods of cognitive science and the main researches in the field of cognitive science.

3. Learning Outcomes

After completing the study of the discipline «Introduction to Cognitive Science» the student should:

- Know the subject and main concepts of cognitive science, its fields, connections with other disciplines, and how it bridges knowledge from multiple perspectives;

- Know basic contribution of disciplines such as philosophy, psychology, neuroscience and artificial intelligence to cognitive science;
- Know the basic methods and researches in the field of cognitive science;
- Know the essence of the main methodological problems of cognitive science;
- Be able to choose an adequate method of cognitive science, in accordance with the research task;
- Be able to critically and orally present on content from various approaches and interpret with respect to cognitive science;
- Be able to choose an adequate method of cognitive science, in accordance with the research task.

4. 3. Course Plan

№	Topic
1.	The basic concepts of cognitive science
2.	History of cognitive science
3.	Symbolic approach in cognitive science
4.	Modular approach in cognitive science
5.	Connectionism in cognitive science
6.	Interdisciplinary research methods in cognitive science: eye tracking
7.	Interdisciplinary research methods in cognitive science: brain study methods
8.	The problem of consciousness in cognitive science
9.	The problem of the substrate of cognitive processes
10.	Interdisciplinary studies of perception and attention
11.	Interdisciplinary studies of learning and memory
12.	Interdisciplinary studies of thinking and speech
13.	Applied cognitive science
14.	Development and prospects of cognitive science

5. Reading List

a. Required

1. Baars B. J., Gage N. M. (2010). Cognition, brain, and consciousness: Introduction to cognitive neuroscience. Academic Press. — Режим доступа:

<https://www.sciencedirect.com/book/9780123750709/cognition-brain-and-consciousness>

2. Fundamentals of cognitive neuroscience: a beginner's guide / **B. J. Baars, N. M. Gage**. – Amsterdam [etc.]: Elsevier: Academic Press, 2013. – 463 с. – На англ.

яз. - ISBN 978-0-12-415805-4. — Режим доступа:

<https://www.sciencedirect.com/book/9780124158054/fundamentals-of-cognitive-neuroscience>

b. Optional

1. Calvo, P., & Gomila, T. (Eds.). (2008). Handbook of cognitive science: An embodied approach. Elsevier. — Режим доступа:

<https://www.sciencedirect.com/book/9780080466163/handbook-of-cognitive-science>

6. Grading System

The formula for the total rate is as follows:

$$O_{total} = 0,6 \times O_{cum} + 0,4 \times O_{exam}$$

The formula for the cumulative rate is as follows:

$$O_{cum.} = 0,4 \times O_{activity} + 0,3 \times O_{test1} + 0,3 \times O_{test2}$$

The cumulative rate is not rounded! Only the total rate is rounded.

Table of Grade Correspondence

Ten-point Grading	Scale Five-point Grading Scale	
1 - very bad 2 – bad 3 – no pass	Unsatisfactory – 2	FAIL
4 – pass 5 – highly pass	Satisfactory – 3	PASS
6 – good 7 – very good	Good – 4	
8 – almost excellent 9 – excellent 10 – perfect	Excellent – 5	

The final grade, which is the resultant grade for the course, goes to the certificate of Master's degree.

7. Guidelines for Knowledge Assessment

Activity assumes attendance on seminar classes and participation in discussions on seminar classes. The formula for the activity rate is as follows:

$$O_{\text{activity}} = 0,2 \times O_{\text{attendance}} + 0,8 \times O_{\text{discussions}}$$

The student has the ability to compensate the classes missed due to sickness (or other serious issue) if it is confirmed by the official document. The student may also compensate the missed classes without the official document twice for the whole course.

Test1 is the multiple choice test on topics 6 and 7.

Test2 is the multiple choice test on topics 10, 11 and 12.

8. Methods of Instruction

The following educational technologies are used in the study process:

- Lectures involving continuous use of multimedia presentations and on-line simulations
- Seminars involving team oral discussions
- Homework assignments
- Self-study of presentation
- Self-study of recommended literature

Course lecturer is advised to use interactive learning methods, which allow participation of the students, such as discussions. It is also expected that multimedia presentations and video materials will be intensively used for the study process.

Students are required to study the presentations, which will be posted on the LMS educational portal, and the recommended reading. Students are required to actively participate in oral discussions during seminars and to take all tests.

9. Special Equipment and Software Support (if required)

The course requires a computer or laptop, projector, and acoustic systems for multimedia presentations and video.