

# SYLLABUS

## Cognitive Neuroscience

University year 2025 - 2026

### 1. Information regarding the programme

1.1. Higher education institution	Babeş-Bolyai University
1.2. Faculty	Faculty of Psychology and Educational Sciences
1.3. Department	Department of Psychology
1.4. Field of study	Psychology - Cognitive Sciences
1.5. Study cycle	Bachelor level
1.6. Study program/Qualification	Psychologist
1.7. Form of education	Full-time studies

### 2. Information regarding the discipline

2.1. Name of the discipline	<b>Introduction to neuroscience</b>	Discipline code	<b>PLE1105</b>				
2.2. Course coordinator	<b>Dr. Lavinia Carmen Uscătescu</b>						
2.3. Seminar coordinator	<b>Dr. Ana Maria Ichim</b>						
2.4. Year of study	<b>1</b>	2.5. Semester	<b>1</b>	2.6. Type of evaluation	<b>EV</b>	2.7. Discipline regime	<b>DD</b>

### 3. Total estimated time (hours/semester of didactic activities)

3.1. Hours per week	<b>4</b>	of which: 3.2 course	<b>2</b>	3.3 seminar/laboratory	<b>2</b>
3.4. Total hours in the curriculum	<b>56</b>	of which: 3.5 course	<b>28</b>	3.6 seminar/laboratory	<b>28</b>
<b>Time allotment for individual study (ID) and self-study activities (SA)</b>					<b>hours</b>
Learning using manual, course support, bibliography, course notes (SA)					28
Additional documentation (in libraries, on electronic platforms, field documentation)					3
Preparation for seminars/labs, homework, papers, portfolios and essays					4
Tutorship					1
Evaluations					2
Other activities:					
<b>3.7. Total individual study hours</b>					<b>38</b>
<b>3.8. Total hours per semester</b>					<b>100</b>
<b>3.9. Number of ECTS credits</b>					<b>5</b>

### 4. Prerequisites (if necessary)

4.1. curriculum	
4.2. competencies	

### 5. Conditions (if necessary)

5.1. for the course	Online course conducted through the MS Teams platform.
5.2. for the seminar /lab activities	Room with at least 50 seats, computer and video projector.

### 6. Specific competencies acquired <sup>1</sup>

<sup>1</sup> One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

<b>Professional/essential competencies</b>	<p><b>Knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>Understanding the place and role of neuroscience within the study of human behavior</li> <li>Knowledge of fundamental aspects and the role of the neuroscience approach in psychology</li> <li>Characterization of the main neural principles and functional-anatomical structures and processes throughout life</li> <li>Understanding the neuroscience perspective on various behavioral functions and phenomena</li> </ul> <p><b>Explanation and interpretation</b></p> <ul style="list-style-type: none"> <li>Arguing the importance of the neuroscience in psychology</li> <li>Interpretation from a neuroscientific perspective of different phenomena and processes (e.g., seeing, hearing, motor control)</li> <li>Explaining and arguing the basic functioning principles of the healthy/typical brain</li> <li>Explaining principles related to brain development and plasticity throughout life</li> </ul> <p><b>Instrumental - applicative</b></p> <ul style="list-style-type: none"> <li>Learning the main concepts and principles that are necessary to understand the overall brain function</li> <li>Developing scientific communication skills as well as skills that are necessary to conduct a research project</li> </ul> <p><b>Attitude</b></p> <ul style="list-style-type: none"> <li>Manifestation of a positive and responsible attitude towards the(neuro)scientific field</li> <li>Cultivating a responsible attitude towards the research activity in the field</li> <li>Interest in personal development in the field.</li> </ul>
<b>Transversal competencies</b>	<ul style="list-style-type: none"> <li>Written and oral communication skills</li> <li>Relationship and teamwork skills</li> <li>Time management skills and the management of resources</li> <li>Competences in using scientific terminology in the field of neuroscience</li> <li>Competences for the interdisciplinary use of knowledge and terminology in the fields of neuroscience and psychology.</li> </ul>

### 7. Objectives of the discipline (outcome of the acquired competencies)

<b>7.1 General objective of the discipline</b>	<ul style="list-style-type: none"> <li>Familiarizing students with neuroscientific approach within the study of psychology</li> </ul>
<b>7.2 Specific objective of the discipline</b>	<ul style="list-style-type: none"> <li>Presentation of neuroscience as an impactful field in psychology</li> <li>Analysis of the place and role of neuroscience in human behavior</li> <li>Discussion of the main neural principles and functional-anatomical structures in neuroscience</li> <li>Neuroscientific approach to the human basic behaviors (e.g., seeing, hearing, moving)</li> <li>Presentation of a neuroscientific perspective on life-long development.</li> </ul>

### 8. Content

<b>8.1 Course</b>	<b>Teaching methods</b>	<b>Remarks</b>
An introduction to Cognitive Neuroscience	Interactive lecture, exemplification, case study, guided discovery	
Human lesion studies and brain stimulation methods		
Electrophysiology		
Structural and functional neuroimaging		
Eye-tracking and pupillometry		
Peripheral psychophysiological measures		
Memory		
Language processing		
Cognitive mechanisms of reading and writing		
Emotions		

Social cognition		
Attention & spatial orientation		
Executive functions		
Computational neuroscience and computational psychiatry		

## **Bibliography**

### Required reading

- Purves, D., ..., & Woldorff, M.G. (2012). Principles of Cognitive Neuroscience. → Chapter 2. The Methods of Cognitive Neuroscience.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 1. Introducing cognitive neuroscience.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 5. The lesioned brain and stimulated brain (pp. 87–101).
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 3. The electrophysiological brain.
- Westbrook, C. & Talbot, J. (2018). MRI in Practice → Chapter 1. Basic principles.
- Graham, L., ... & Stuart, S. (2022). The Eyes as a Window to the Brain and Mind. In Stuart, S. (Editor), Eye Tracking Background, Methods, and Applications (pp. 1–14). Humana Press.
- Levinson, A., & Hajcak, G. (2020). Peripheral Psychophysiology. The Cambridge Handbook of Research Methods in Clinical Psychology, 118–135.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 11. The remembering brain.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 12. The speaking brain.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 13. The literate brain.
- Bear, M., Connors, B., & Paradiso, M. A. (2016). Neuroscience: Exploring the Brain. → Chapter 18. Brain Mechanisms of Emotion.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 16. The social and emotional brain.
- Ward, J. (2017). The Student's Guide to Social Neuroscience. → Chapter 1. Introduction to social neuroscience.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 9. The attending brain.
- Ward, J. (2020). The student's guide to Cognitive Neuroscience. → Chapter 15. The executive brain.

### Recommended reading

- Purves, D., ..., & Woldorff, M.G. (2012). Principles of Cognitive Neuroscience. → Chapter 1. Cognitive Neuroscience: Definitions, Themes, and Approaches.
- Adolphs, R. (2016). Human Lesion Studies in the 21st Century. Neuron, 90(6), 1151–1153.
- Joutsa, J., Lipsman, N., Horn, A., Cosgrove, G. R., & Fox, M. D. (2023). The return of the lesion for localization and therapy. Brain, 146(8), 3146–3155.
- Kolb, B. (2022). Brenda Milner: Pioneer of the Study of the Human Frontal Lobes. Frontiers in Human Neuroscience, 15.

- Squire, L. R. (2009). The Legacy of Patient H.M. for Neuroscience. *Neuron*, 61(1), 6–9.
- McFarland, D. J., & Wolpaw, J. R. (2017). EEG-based brain–computer interfaces. *Current Opinion in Biomedical Engineering*, 4, 194–200.
- Westbrook, C. & Talbot, J. (2018). *MRI in Practice* → Chapter 2. Image weighting and contrast.
- Westbrook, C. & Talbot, J. (2018). *MRI in Practice* → Chapter 8. Artifacts.
- Carter, B. T., & Luke, S. G. (2020). Best practices in eye tracking research. *International Journal of Psychophysiology*, 155, 49–62.
- Graham, L., ... & Stuart, S. (2022). A Brief History of Eye Movement Research. In Stuart, S. (Editor), *Eye Tracking Background, Methods, and Applications* (pp. 15–29). Humana Press.
- Tassinari, L. G., Hess, U., & Carcoba, L. M. (2012). Peripheral physiological measures of psychological constructs. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology, Vol. 1. Foundations, planning, measures, and psychometrics* (pp. 461–488). American Psychological Association.
- Clayton, N. S., & Wilkins, C. (2018). Seven myths of memory. *Behavioural Processes*, 152, 3–9.
- Fedorenko, E., Hsieh, P.-J., Nieto-Castañón, A., Whitfield-Gabrieli, S., & Kanwisher, N. (2010). New Method for fMRI Investigations of Language: Defining ROIs Functionally in Individual Subjects. *Journal of Neurophysiology*, 104(2), 1177–1194.
- Fedorenko, E., & Thompson-Schill, S. L. (2014). Reworking the language network. *Trends in Cognitive Sciences*, 18(3), 120–126.
- Chakravarthi, R., Nordqvist, A., Poncet, M., & Adamian, N. (2023). Fundamental units of numerosity estimation. *Cognition*, 239, 105565.
- Chung, P. J., Patel, D. R., & Nizami, I. (2020). Disorder of written expression and dysgraphia: definition, diagnosis, and management. *Translational Pediatrics*, 9(S1).
- Hulme, C., & Snowling, M. J. (2016). Reading disorders and dyslexia. *Current Opinion in Pediatrics*, 28(6), 731–735.
- Rapin, I. (2016). Dyscalculia and the Calculating Brain. *Pediatric Neurology*, 61, 11–20.
- Goerlich, K. S. (2018). The Multifaceted Nature of Alexithymia – A Neuroscientific Perspective. *Frontiers in Psychology*, 9.
- Hogeveen, J., & Grafman, J. (2021). Alexithymia. *Disorders of Emotion in Neurologic Disease*, 47–62.
- Kilford, E.J. & Blakemore, S.-J. (2020). Social cognition and social brain development in adolescence. In Poeppel, D., Mangun, G.R. & Gazzaniga, M.S. (Eds.), *The Cognitive Neurosciences* (pp. 37–46). The MIT Press.
- Ward, J. (2017). *The Student’s Guide to Social Neuroscience*. → Chapter 2. The methods of social neuroscience.

- Wheatley, T. & Boncz, A. (2020). Interpersonal Neuroscience. In Poeppel, D., Mangun, G.R. & Gazzaniga, M.S. (Eds.), *The Cognitive Neurosciences* (pp. 987–995). The MIT Press.
- Corbetta, M., & Shulman, G. L. (2002). Control of goal-directed and stimulus-driven attention in the brain. *Nature Reviews Neuroscience*, 3(3), 201–215.
- Blair C. (2017). Educating executive function. *Wiley interdisciplinary reviews. Cognitive science*, 8(1-2), 10.1002/wcs.1403.
- Fernandes, B. S., Williams, L. M., Steiner, J., Leboyer, M., Carvalho, A. F., & Berk, M. (2017). The new field of ‘precision psychiatry.’ *BMC Medicine*, 15(1).
- Huys, Q. J. M., Maia, T. V., & Frank, M. J. (2016). Computational psychiatry as a bridge from neuroscience to clinical applications. *Nature Neuroscience*, 19(3), 404–413.
- Kriegeskorte, N., & Douglas, P. K. (2018). Cognitive computational neuroscience. *Nature Neuroscience*, 21(9), 1148–1160.

8.2 Seminar / laboratory	Teaching methods	Remarks
The seminar will closely follow and build on the lecture topics.	Lecture, student presentation, group work, case study, guided discovery, and engagement with contemporary experimental research.	The seminar will offer an in-depth exploration of the topics covered by the lectures and will offer students the opportunity to develop their group work and presentation skills. In addition, the seminar is designed to foster critical thinking in modern neuroscience.

**9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program**

- The lecture and seminar cover central topics in the field of Cognitive Neuroscience, based on the most recent results in the literature. The content aligns to the curriculum taught at all universities in Romania and abroad for this discipline.
- The lecture and seminar are designed to equip students with the knowledge and critical thinking skills that will enable them to pursue a research-focused career.

**10. Evaluation**

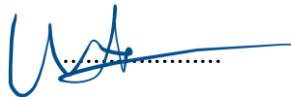
Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	Critical thinking skills and integration of theoretical knowledge	Written exam	50%
10.5 Seminar/laboratory		Written exam	50%
10.6 Minimum standard of performance			
<ul style="list-style-type: none"> <li>• Students must obtain at least 50 points (out of 100 maximum) on the final exam to pass.</li> </ul>			

**11. Labels ODD (Sustainable Development Goals)<sup>2</sup>**

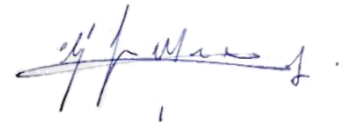
 <p>General label for Sustainable Development</p>									
<p><b>1</b> NO POVERTY</p> 	<p><b>2</b> ZERO HUNGER</p> 	<p><b>3</b> GOOD HEALTH AND WELL-BEING</p> 	<p><b>4</b> QUALITY EDUCATION</p> 	<p><b>5</b> GENDER EQUALITY</p> 	<p><b>6</b> CLEAN WATER AND SANITATION</p> 	<p><b>7</b> AFFORDABLE AND CLEAN ENERGY</p> 	<p><b>8</b> DECENT WORK AND ECONOMIC GROWTH</p> 	<p><b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE</p> 	
<p><b>10</b> REDUCED INEQUALITIES</p> 	<p><b>11</b> SUSTAINABLE CITIES AND COMMUNITIES</p> 	<p><b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION</p> 	<p><b>13</b> CLIMATE ACTION</p> 	<p><b>14</b> LIFE BELOW WATER</p> 	<p><b>15</b> LIFE ON LAND</p> 	<p><b>16</b> PEACE, JUSTICE AND STRONG INSTITUTIONS</p> 	<p><b>17</b> PARTNERSHIPS FOR THE GOALS</p> 		

Date:  
26/11/2025

Signature of course coordinator



Signature of seminar coordinator



Date of approval:

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Signature of the head of department

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<sup>2</sup> Keep only the labels that, according to the *Procedure for applying ODD labels in the academic process*, suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable.*”.