

COGNITIVE NEUROSCIENCE

Professor Franco Pestilli , The University of Texas
Co-Instructor Prof. Ilaria Sani, University of Geneva

Thank you for your interest in attending our course, please see the information about the course below; credit sheet can be found at the end of the page.

COURSE DESCRIPTION

Cognitive neuroscience is an interdisciplinary field investigating human cognition's neural mechanisms, including perception, attention, memory, language, decision-making, and consciousness. It bridges psychology, neuroscience, biology, engineering, and computer science disciplines. This course offers an in-depth examination of cognitive neuroscience principles, methods, and findings. Students will understand how brain structure and function relate to cognitive processes, integrating insights from neuroscience, psychology, biology, and related fields. Through lectures, discussions, readings, and hands-on activities, students will explore key topics such as brain imaging and analysis techniques, neural networks, neuroplasticity, brain development, and cognitive disorders. Emphasis will be placed on critical thinking, experimental design, and interpreting empirical research in cognitive neuroscience.

LEARNING GOALS

1. Learn about cognitive neuroscience techniques and the pros/cons of different methods
2. Gain exposure to current theories and debates in cognitive neuroscience
3. Become a critical consumer of scientific research through the evaluation of research articles
4. Develop writing skills that complement generative artificial intelligence tools like ChatGPT
5. Communicate your knowledge through writing, class participation, and examination

SUGGESTED TEXT

Essentials of Cognitive Neuroscience , *Bradley R. Postle* 2nd Edition, John Wiley & Sons. It is available for rent or purchase on Wiley, Amazon, and other sources. Content covered by exams will focus on information presented in class. Students are also likely to benefit from studying the textbook.

PRACTICAL INFO

The course will take place from May 8th to June 2nd, 2025, with plans for an annual repetition. Classes will be held from **9:15 AM to 12:00 PM** at Campus Biotech (Building H8, Room H8-01-F) and will feature lectures by Prof. Pestilli, along with guest lectures from PIs at UNIGE, EPFL, or Campus Biotech.

The Maymester aims to provide UT and Geneva students with a valuable international experience while fostering academic exchange. To support this, 8–12 seats will be reserved for our students. Participants may attend one or multiple classes. Seats will be allocated on a first-come, first-served basis, with priority given to students from labs involved in lecturing or offering research opportunities as part of the program.

Upon successful participation (signature sheet can be found at the end of the document) credits will be awarded as follows:

- **LNDS students** : Put one entry per class on your seminar sheet (12 entries = 1 ECTS) and let your supervisor sign once per sheet.

For interested students, at the end of the course, an online quiz-based exam will be conducted (questions with multiple choice responses). Students are expected to answer questions related to the classes they attended. The successful completion of the exam may award additional credits, e.g. for LNDS students. Contact Ilaria Sani if you are interested in taking the exam.

REGISTER HERE:

<https://forms.gle/srUxnjpiJtjrXKQr5>

PLANNED CLASSES & LECTURES

WEEK	DAY	TOPIC	Reading	Titles
W1	Th May 8 Class 1	The brain	Ch 1 & 2	
	Fr May 9 Class 2	Cog Neuro Methods	Ch 3	
W2	M May 12 Class 3	Vision	Ch 4	
		<i>Guest lecture 1: Ilaria Sani</i>		In the object's shoes: neural correlates of spatial vision
	T May 13 Class 4	Attention	Ch 6	
		White matter & cognition	Special reading	
Franco Pestilli Plenary talk 12:15 , room H8.1D				

	W May 14 Class 5	Object recognition	Ch 10	
		<i>Guest lecture 2: Daphne Bavelier</i>		Brain Plasticity, Learning and Video games
	Th May 15 Class 6	Memory	Ch 11	
W3	M May 19 Class 7	Declarative Memory	Ch 12	
		<i>Guest lecture 3: Ulrike Rimmele</i>		How emotions, stress and their regulation influence human memory
	T May 20 Class 8	Semantic Memory	Ch 13	
		<i>Guest lecture 4: Eva Pool</i>		Emotions, reward, and decision making
	W May 21 Class 9	Working Memory	Ch 14	
		<i>Guest lecture 5: Sophie Schwartz</i>		Memory reprocessing during sleep and dreaming
	Th May 22 Class 10	Brain Networks	Special Reading	
		<i>Guest lecture 6: Alex Pouget</i>		<i>Neural basis of compositionality</i>
W4	T May 27 Class 11	Open Science		
		<i>Guest lecture 7: Patrik Vuilleumier</i>		Real-time imaging for neurofeedback and self regulation of brain activity: methods & applications to attention and emotion regulation
	W May 28 Class 12	Neuroinformatics	Special reading	
		<i>Guest lecture 8: Dimitri Van de Ville</i>		Brain connectivity
W5	M June 2 Class 3	Scientific Rigor & Transparency	Special Reading	

Attendance - First/Last Name: _____

Program: Neuromaster [], LNDS [], Other [],

Class number	Date	Place	Speaker & Lecture title	Organizers	Signature	Exam score
1	May-08	Geneva (CB)	Pestilli: The brain	Sani-Pestilli		
2	May-09	Geneva (CB)	Pestilli: Cognitive Neuroscience Methods	Sani-Pestilli		
3	May-12	Geneva (CB)	Pestilli: Vision	Sani-Pestilli		
4	May-13	Geneva (CB)	Pestilli: Attention	Sani-Pestilli		
			Pestilli: White matter & cognition			
5	May-14	Geneva (CB)	Pestilli: object recognition	Sani-Pestilli		
			Daphne Bavelier: <i>Brain Plasticity, Learning and Video games</i>			
6	May-15	Geneva (CB)	Pestilli: Memory	Sani-Pestilli		
7	May-19	Geneva (CB)	Pestilli: declarative memory	Sani-Pestilli		
			Ulrike Rimmele: <i>'Memory'</i>			
8	May-20	Geneva (CB)	Pestilli: semantic memory	Sani-Pestilli		
			Eva Pool: <i>'Emotions & the brain'</i>			
9	May-21	Geneva (CB)	Pestilli: working memory	Sani-Pestilli		
			Sophie Schwartz: <i>'Sleep & Memory'</i>			
10	May-22	Geneva (CB)	Pestilli: Brain networks	Sani-Pestilli		
			Alex Pouget: <i>'Neural basis of compositionality'</i>			
11	May-27	Geneva (CB)	Pestilli: Open Science	Sani-Pestilli		
			Patrik Vuilleumier: <i>'TBD'</i>			
12	May-28	Geneva (CB)	Pestilli: Neuroinformatics	Sani-Pestilli		
			Dimitri Van de Ville: <i>'Brain connectivity'</i>			
13	Jun-02	Geneva (CB)	Pestilli: scientific rigor and transparency	Sani-Pestilli		