Cognitive Neuroscience (NEUR 3084)

2024 Fall

Prerequisite: NEUR 2026

Class Time: TBD

Class Location: TBD

Instructor: Dr. Zhuo Fu zhuofu@vt.edu

Graduate Teaching Assistants (GTAs):

TBD.

GTAs are graduate students from our department. Besides knowing our course materials, they are well-informed about the professors and research programs in our department.

Undergraduate Teaching Assistants (UTAs):

TBD.

UTAs are undergraduate students who were previously in this course. In addition to understanding our course materials, they are knowledgeable about resources for undergraduates.

Office hours:

In-person official hours:

Time: TBD

Location: Sandy 1st floor

During office hours, my TAs and I can meet to clarify questions and explain concepts that you may have misunderstood. We can also discuss questions that you answered incorrectly in previous assignments. However, we cannot provide the answers to any questions, before you have completed an assignment. Please refrain from asking what the correct answer is to any question. Also, do not ask us to double-check your answers; independent decision-making is one of the key educational goals of college.

By email:

For quick clarifications, emailing me (zhuofu@vt.edu) is a better option because I respond to emails super fast, unless I am driving, sleeping, teaching, in meetings, cooking, or working out; then you may need to wait a few minutes. When asking about a specific question via email, please include a screenshot (or photo) of the question. (Providing the question number is not helpful, as your sequence of questions may differ from mine.)

Recommended Textbook and Reading Materials:

Brain & Behavior: A Cognitive Neuroscience Perspective. Eagleman and Downar. 2nd Edition. ISBN: 978-0190861650

Real-World Applications in Cognitive Neuroscience. Beth Louise Parkin. ISBN:9780128207246 (Digital version of this book is available at VT library)

Course Description:

This course delves into the fundamental concepts and methods of cognitive neuroscience, offering an integrative approach to understanding the relationship between mental processes and brain functions. Students will explore the structural and functional underpinnings of neural systems, gaining insights into how these biological components interact to support cognition, including memory, attention, emotion, decision-making, etc. Through a combination of theoretical discussion and practical analysis, the course aims to equip students with a comprehensive understanding of the neural bases of various mental functions.

Learning objectives:

1. Explain the structure and function of neural systems
2. Formulate how neural system sub-components work together, including connections between different brain structures and networks
3. Solve problems regarding how biological functions in the brain are related to mental functions such as memory, attention, and emotion.
4. Analyze the methods scientists use to study connections between biological brain functions and mental experience
5. Explain the differences in neural system structures and processes that make atypical/disordered cognitive functions distinct
6. Evaluate the practical aspects of cognitive neuroscience research that may be useful for treatment of neurological and mental disorder

Grading:

1. **Study guides (12 * 1% = 12%)**: Before each lecture, you will be given a pre-lecture study guide. You can use all resources (including ChatGPT) to complete them, but your answers must be handwritten.
2. **Post-lecture quiz (12 * 1% =12%)**: Right after each lecture, you will have an in-class quiz. Questions will be based on your study guide and the lecture of the day.
3. **Read and debate (10%)**: We will have 9 debate days, and you must participate on a debate team at least once to earn this 10% grade. For each debate day, two teams will debate the article shared in the syllabus. The Affirmative team will spend 20 minutes explaining the paper, and the Negative team will have the next 20 minutes to question the methods, results, and implications of the paper. After the debate, each team will have 5 minutes to answer questions from the audience. At the end, students will vote for the winning team. (Find more detailed debate instructions on Canvas.)
4. **Post-debate discussion (9*1%=9%)**: After the read and debate day:
    a. If you are not on the debate team, you need to complete the discussion board by listing three take-home messages from the debate.
    b. If you are on the debate team, you are required to make one post and nine replies. Your initial post should discuss the most important information you have gleaned from this paper. For the second part of your discussion, you will reply to nine classmates who have not yet received a response from a debate team member. For each classmate, provide feedback on each of the three points in their posts.

5. **Participation (12%)**: Over the entire semester, you must speak or ask questions at least 3 times as an audience member in a lecture or a debate to earn these 10% participation points.
6. **Exams (3* 15%=45%)**: For each exam, you will have 30 multiple-choice questions and 1 hour to complete them. There are three exams in total. Only the last one is cumulative.

Course policy:

Late policy: For each hour of late submission, there will be a 2.1% reduction in points. No submissions will be accepted after 48 hours from the due date.

Deadline extension:
A deadline extension will be granted if you provide a doctor's note, dean's letter, or an SSD (Services for Students with Disabilities) letter (and adhere to the rules specified in the letter). Power outages, internet disruptions, or computer failures will not be accepted as excuses unless documented with a Dean's letter.
If you have an SSD letter regarding deadline accommodation, ensure that you read the letter and follow the instructions within. Deadline extensions will not be granted without a doctor's note, dean's letter, or adherence to the rules in the SSD letter.

Missing class:
For the class you have to miss, providing a doctor's note or dean's letter will exempt you from the attendance or the discussion assignment of the day. You will also receive an opportunity to complete the post-lecture quiz.
If you have to miss the debate date, you will need to find another team to join later in order to earn the debate point.

Final letter grades will be assigned as follows:

A 93-100	B+ 87-89.9	C+ 77-79.9	D+ 67-69.9	F 0-59.9
A- 90-92.9	B 83-86.9	C 73-76.9	D 63-66.9	
	B- 80-82.9	C- 70-72.9	D- 60-62.9	

Tentative course schedule:

W/D	Pre-lecture assignment	Topic of the Day	Post-lecture	Textbook
1a		Course Overview; Introductions		
1b		Overview of Cognitive Neuroscience; Effective Literature Reading		Book1_Chapter 1
2a	Study guide 1	Neuroanatomy	Quiz 1	Book1_Chapter 2
2b		Cognitive neuroscience methods and techniques		
3a	Study guide 2	Vision	Quiz 2	Book1_Chapter 5
3b		Read and debate 1 The effects of visual training on sports skill in volleyball players	Discussion 1	Book2_ Chapter 11
4a	Study guide 3	Other Senses	Quiz 3	Book1_Chapter 6
4b		Read and debate 2 Mere Exposure: Preference Change for Novel Drinks Reflected in Human Ventral Tegmental Area	Discussion 2	J Cogn Neurosci (2017)

5a	Study guide 4	Attention and Consciousness	Quiz 4	Book1_Chapter 8
5b		EXAM1		
6a	Study guide 5	Learning and Memory	Quiz 5	Book1_Chapter 9
6b		Read and debate 3 Aerobic Fitness Predicts Relational Memory but Not Item Memory Performance in Healthy Young Adults	Discussion 3	J Cogn Neurosci (2014)
7a	Study guide 6	Sleep	Quiz 6	Book1_Chapter 10
7b		Read and debate 4 Applications in sleep: How light affects sleep	Discussion 4	Book2_ Chapter 2
8a	Study guide 7	Language and Speech	Quiz 7	Book1_Chapter 11
8b		Read and debate 5 Musicians Detect Pitch Violation in a Foreign Language Better Than Nonmusicians: Behavioral and Electrophysiological Evidence	Discussion 5	J Cogn Neurosci (2007)
9a	Study guide 8	Decision Making	Quiz 8	Book1_Chapter 12
9b		EXAM2		
10a	Study guide 9	Emotions	Quiz 9	Book1_Chapter 13
10b		Read and debate 6 Psychology and neuroscience applied to financial decision-making	Discussion 6	Book2_ Chapter 7
11a	Study guide 10	Motivation and Reward	Quiz 10	Book1_Chapter 14
11b		Read and debate 7 Amygdala Functional Connectivity with Medial Prefrontal Cortex at Rest Predicts the Positivity Effect in Older Adults' Memory	Discussion 7	J Cogn Neurosci (2013)
12a	Study guide 11	Social Cognition	Quiz 11	Book1_Chapter 15
12b		Read and debate 8 The psychology of sustainable consumption	Discussion 8	Book2_Chapter 15
13a	Study guide 12	Eating and feeding	Quiz 12	
13b		Read and debate 9 Weight Gain Is Associated with Reduced Striatal Response to Palatable Food	Discussion 9	J. Neuroscience. (2010)
14a/b		Thanks giving break		
15a		Neurological and Psychiatric Disorders		Book1_Chapter 16
15b		TBD		
16a		Final exam		

To enjoy this course:

Take our study guide seriously, familiarize yourself with terminology before class.
Have ChatGPT ready during the lecture. Ask ChatGPT to explain terminologies that intimidate you during the class.
Turn in assignments on time.

Let go of the points that you lost.
avoid comparing grades with peers.
Focus on what you can improve and acknowledge yourself for what you have done well.

Canvas Instruction:

To find content for each week, you ONLY need to click "**Module**" tab on the left.
To check you grade, click "**Grades**" tab.
To check announcement, click "**Announcements**" tab.
If you want to get stressed and confused, you can check out other tabs. But I highly and kindly suggest you to ignore them all for this class!!!

Disabilities:

Virginia Tech welcomes students with disabilities into the University's educational programs. The University promotes efforts to provide equal access and a culture of inclusion without altering the essential elements of coursework. If you anticipate or experience academic barriers that may be due to disability, including but not limited to ADHD, chronic or temporary medical conditions, deaf or hard of hearing, learning disability, mental health, or vision impairment, please contact the Services for Students with Disabilities (SSD) office (540-231-3788, ssd@vt.edu, or visit www.ssd.vt.edu).

SSD accommodation:

After your accommodation letter is approved by SSD officers, it will automatically be forwarded to me. You will also receive an email confirming that I have acknowledged your accommodation request. Based on the letter, I will provide accommodation for you. No further action is required on your part.

Academic dishonesty:

Students who use ChatGPT and similar tools without permission, or who use them in improper ways, are violating the academic integrity rules of the University

The Undergraduate Honor Code pledge that each member of the university community agrees to abide by states: "As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do." Students who are enrolled in this course are expected to abide by the Honor Code at all times.

A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code. Academic integrity expectations are the same for online classes as they are for in person classes. All university policies and procedures apply in any Virginia Tech academic environment.

For additional information about the Honor Code, please visit: www.honorsystem.vt.edu

All assignments submitted shall be considered "graded work" and all aspects of your coursework are covered by the Honor Code. All projects and homework assignments are to be completed individually unless otherwise specified. The Academic Integrity expectations for

Hokies are the same in an online class as they are in an in-person class. Hokies are expected to meet the academic integrity standards at Virginia Tech at all times.

Commission of any of the following acts shall constitute academic misconduct. This listing is not, however, exclusive of other acts that may reasonably be said to constitute academic misconduct. Clarification is provided for each definition with some examples of prohibited behaviors in the Undergraduate Honor Code Manual, located at www.honorsystem.vt.edu

1. CHEATING: Cheating includes the intentional use of unauthorized materials, information, notes, study aids, or other devices or materials in any academic exercise, or attempts thereof.
2. PLAGIARISM: Plagiarism includes the copying of the language, structure, programming, computer code, ideas, and/or thoughts of another and passing off the same as one's own original work, or attempts thereof.
3. FALSIFICATION: Falsification includes the statement of any untruth, either verbally or in writing, with respect to any element of one's own academic work, or attempts thereof.
4. FABRICATION: Fabrication includes making up data and results, and recording or reporting them, or submitting fabricated documents, or attempts thereof.
5. MULTIPLE SUBMISSION: Multiple submission involves the submission for credit – without authorization of the instructor receiving the work – of substantial portions of any work (including oral reports) previously submitted for credit at any academic institution, or attempts thereof.
6. COMPLICITY: Complicity includes intentionally helping another to engage in an act of academic misconduct, or attempts thereof.
7. VIOLATION OF UNIVERSITY, COLLEGE, DEPARTMENTAL, PROGRAM, COURSE, OR FACULTY RULES: The violation of any University, College, Departmental, Program, Course, or Faculty Rules relating to academic matters that may lead to an unfair academic advantage by the student violating the rule(s).

If you have questions or are unclear about what constitutes academic misconduct on an assignment, please speak with the instructor(s). The instructors take the Honor Code very seriously in this course. The normal sanction recommended for a violation of the Honor Code is an F* sanction as your final course grade. The F represents failure in the course. The "*" is to identify a student who has failed to uphold the values of academic integrity at Virginia Tech. A student who receives a sanction of F* as their final course grade shall have it documented on their transcript with the notation "FAILURE DUE TO ACADEMIC HONOR CODE VIOLATION." You would be required to complete an education program administered by the Honor System in order to have the "*" and "FAILURE DUE TO ACADEMIC HONOR CODE VIOLATION" removed from your transcript. The "F" however would be permanently on your transcript.

PLAGIARISM**:** Do not copy anything from anywhere and turn it in as your work. Any work that is not your own and is not cited is plagiarism and a violation of the Honor Code. In science, the convention is to summarize and interpret work, rather than directly quoting a source, and you are expected to follow this standard for all written work.

Your written assignments may be reviewed through the University's plagiarism prevention and detection software called *Turnitin – Feedback Studio,* which is a resource designed to detect and prevent plagiarism. This software is a tool that works by cross-referencing submitted materials with journals, essays, newspaper articles, books, the internet, and other literary works. *Turnitin – Feedback Studio* does not identify all forms of plagiarism. The software also does not replace the instructors' judgment regarding what constitutes plagiarism.

For additional information, please visit: https://www.honorsystem.vt.edu/