**PSY 370 – COGNITIVE NEUROSCIENCE**

**GRAND VALLEY STATE UNIVERSITY**

**WINTER, 2023**

**Section 01: TR 11:30 am - 12:45 pm, 2302 Au Sable Hall**

**Section 02: TR 1:00 pm – 2:15pm, 2302 Au Sable Hall**

**INSTRUCTOR**: Joel Quamme, Ph. D.

**OFFICE**: 1311 Au Sable Hall

**PHONE**: 1-2153 **(not recommended)**

**E-MAIL**: [quammej@gvsu.edu](mailto:quammej@gvsu.edu) **(recommended)**

**OFFICE HOURS**: TR 10:00 am – 11:15 am, or by appointment.

**REQUIRED TEXT:**

GVSU SAVE PSY370 1ST DAY DIGITAL ACCESS to Gazzaniga, Ivry, & Mangun (2018) *Cognitive Neuroscience; The Biology of the Mind* (5th ed). New York: Norton, ISBN-13: 9780393603170

All students enrolled in this class are automatically given access to this e-text through the GVSU Save program the first day of class. GVSU Save will automatically charge your account for these materials.

You have the choice to opt-out of GVSU Save and purchase this text elsewhere. If you wish to opt out, you must do so by Friday 1/20/23 to avoid having your account charged.

**PREREQUISITES:**

Completion of Psychology 101 (Introduction to psychology) and Junior standing or higher.

# COURSE DESCRIPTION

*Cognitive Neuroscience* seeks to explain how the brain gives rise to the functions of the mind.

This class will explore the neural basis of higher cognitive processes, including object recognition, attention, memory, language, and executive control, as well as interactions among cognition, emotion, and social processes. The course emphasizes contemporary theories of how cognitive processes are implemented in the brain, and the findings of empirical research into brain-cognition relationships.

Students will be introduced to the wide variety of methods used by cognitive neuroscientists to understand the brain substrates of cognition, including studies of patients with neuropsychological impairments, imaging and recording of brain activity during cognitive performance, electrical and magnetic stimulation of brain regions, computational modeling of neural systems, and the analysis of behavioral performance. We will critically examine how cognitive neuroscientists use these methods to draw inferences about the neural basis of cognition, and how the findings of cognitive neuroscience research are presented to the public.

**COURSE OBJECTIVES**

My goal is that by the end of the course, students will be able to:

* Identify the historical roots of the modern study of cognitive neuroscience, including major philosophical and scientific developments.
* Describe the modern methods of cognitive neuroscience, analyze their strengths and weakness, and evaluate their application to different kinds of research problems.
* Analyze contemporary theories and evidence of the neural bases of core cognitive processes, including attention, memory, language and higher cognitive processes.
* Comprehend primary literature on the neural basis of cognition, and draw scientific conclusions from data of cognitive neuroscience studies.
* Critically evaluate claims about the neural basis of cognitive phenomena, such as those encountered in popular media.

**GRADING**

Grades will be computed based on your performance on three exams, quizzes on the material covered each week, and number of other assignments based on additional readings, in-class activities, or homework

# 3 Non-cumulative Exams: 60%

**Weekly Quizzes: 20%**

**Assignments: 20%**

# Grading scale. The percentage of total credit you earn will be converted to letter grades according to the following scheme:

A 100-94 A- 90-93 B+ 87-89 B 83-86

B- 80-82 C+ 77-79 C 73-76 C- 70-72

D+ 67-69 D 60-66 F 59 or lower

**Exams.** There will be three ***non-cumulative*** exams, each worth 20% of your grade (for a total of 60%). The exams will contain a mix of multiple choice and other formats such as short answer, completion, and labelling. The material tested on exams will come from lecture material, class activities, textbook, and any other assigned readings.

Re-scheduling or making up an exam will be allowed solely at my discretion. I will excuse a missed exam related to a university-sanctioned event, a personal illness, family emergency, or major religious holiday provided you (1) can give me advance notice of at least one week (if your absence is forseeable), or a timely explanation on your return (if the absence is unforeseeable), and (2) you can provide me with documentation from an appropriate faculty member, university administrator, physician, or clergy member. An unexcused absence from an exam will constitute a score of 0.

**Weekly Quizzes.** During most weeks there will be a multiple-choice quiz covering fundamental points of the material from textbook chapters or chapter sections assigned that week. When a quiz is due, it will be posted to Blackboard on Monday and due the next Sunday night, by 11:59. Quizzes may be completed at any time before the deadline once they are available. Once begun, there is a time limit in which you must complete the quiz, but you are free to consult the book, notes, slides or other materials while taking it. Taking the quiz late will result in a 1 point penalty to the quiz score for each day it is late. I will also let you skip two quizzes with no penalty.

**Assignments.** Throughout the semester, there will bea number ofadditional assignments to complete. The nature of these assignments will vary. For instance, some assignments will require you to read an article and answer questions about it relating the material from lecture and textbook. Other assignments will involve completing an online simulations of classic experiments that illustrate cognitive processes under discussion in class. Some assignments may require the use of in-class exercises or information from discussions. Typically assignments will be completed online, either by uploading something to blackboard, or submitting to Norton’s online platform. In all cases, assignments will be announced in class, and instructions for how to complete the assignment will be posted on blackboard along with other weekly content at least a week ahead of their due date.

**PLAGIARISM**

According to the 2008/9 GVSU Student Code, Section 223.01: “Any ideas or material taken from another source for either written or oral presentation must be fully acknowledged. Offering the work of someone else as one's own is plagiarism. The language or ideas taken from another may range from isolated formulas, sentences, or paragraphs to entire articles copied from books, periodicals, speeches or the writings of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment also is considered plagiarism. Any student who fails to give credit in written or oral work for the ideas or materials that have been taken from another is guilty of plagiarism***.” Detected plagiarism may result in a grade of 0% on any paper or assignment on which it occurs, and possibly an F in the course. You have been warned.***

**ELECTRONIC DEVICES**

Please turn all cell phones, pagers and other electronic devices with audible signals or alarms OFF during any virtual class meeting.

**ACCOMODATION FOR DISABILITY**

Any student in this class who has special needs because of a learning, physical, or other disability, please contact me or Disability Support Resources (DSR) at 331-2490.

# CLASS SCHEDULE

The following schedule of class topics, reading assignments and due dates is tentative, and may need to be modified later in the course. Any changes to the schedule will be announced and a modified schedule will be posted to blackboard.

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| **Week** | **Dates** | **Class Topics** | **Book chapters** | **Quiz due** |
| 1 | T 1/10 & R 1/12 | Introduction; Historical and Philosophical Foundations | Ch. 1.1-1.5 | Quiz 1 |
| 2 | T 1/17 & R 1/19 | Neurons & Neuroanatomy | Ch. 2.1-2.3 | Quiz 2 |
| 3 | T 1/24 & R 1/26 | Neuroanatomy cont’d  Behavioral methods of Cognitive Science | Ch. 2.4-2.6  Ch. 3.1 | Quiz 3 |
| 4 | T 1/31 & R 2/2 | Lesion & Stimulation Methods  Cognitive Electrophysiology | Ch. 3.2-3.5 | Quiz 4 |
| 5 | T 2/7  **R 2/9** | Brain Imaging  **EXAM 1 (Ch 1, 2, 3)** | Ch. 3.6-3.7 |  |
| 6 | T 2/14 & R 2/16 | Object Recognition | Ch. 6.1-6.6 | Quiz 5 |
| 7 | T 2/21 & R 2/23 | Attention | Ch. 7.1-7.5 | Quiz 6 |
| 8 | T 2/28 & R 3/2 | Memory I | Ch. 9.1- 9.3 | Quiz 7 |
| 9 | 3/6-3/12 | **SPRING BREAK** | | |
| 10 | T 3/14 & R 3/16 | Memory II | Ch. 9.4-9.6 | Quiz 8 |
| 11 | **T 3/21**  R 3/23 | **EXAM 2 (Ch 6, 7, 9)**  Hemispheric lateralization | Ch. 4.1-4.3 |  |
| 12 | T 3/28 & R 3/30 | Hemispheres cont’d  Speech & Language I | Ch. 4.4-4.5  Ch. 11.1-11.3 | Quiz 9 |
| 13 | T 4/4 & R 4/6 | Speech & Language II | Ch. 11.4-11.6 | Quiz 10 |
| 14 | T 4/11 & R 4/13 | Cognitive Control | Ch. 12.1-12.7 | Quiz 11 |
| 15 | T 4/18 & R 4/20 | Affective & Social Cognition | Ch.10.1-10.3; 10.5-10.9 | Quiz 12 |
| **Finals**  **Week** | **Section 01: 4/25 Tuesday, 10:00am-11:50am**  **Section 02: 4/25 Tuesday, 12:00pm-1:50pm** | | EXAM 3 (Ch 4, 11, 12, 10) | |