Description
The general goal of this course is to give you experience with the scientific process of asking and answering questions in cognitive science. The course reviews selected methods from the many disciplines (such as experimental psychology, cognitive neuroscience, linguistics, and the field of artificial intelligence) that contribute to the broad field of cognitive science. You will also learn the principles of ethical research conduct and practices of transparent science. The laboratory exercises for this course will provide you with an opportunity to practice designing scientific experiments, to learn to experience experimental science, evaluate the suitability of a given methodology, and analyzing the data.

Learning Objectives - Students Who Complete This Course Will:
1. Understand the methods used to study human cognition and its neural substrates.
2. Be able to read, interpret, and critique experimental evidence pertaining to current theories and hypotheses in cognitive neuroscience.
3. Be able to ask and answer your own questions by conducting, analyzing, and reporting the results of experiments that you conduct.
4. Be able to organize information about cognitive neuroscience in a clear and concise manner.

Textbook
The following books are required (Both are free).


3) Supplemental materials and primary research articles will be posted on Canvas throughout the semester.
**Academic Integrity**

Each student in this course is expected to abide by the Rutgers University Code of Student Conduct and Academic Integrity Policy. The policies found in the Rutgers Academic Integrity Policy (http://academicintegrity.rutgers.edu/) apply to this course. Integrity is the practice of being honest and showing a consistent and uncompromising adherence to strong moral and ethical principles and values.  

Of course, you are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, online forums, a flash drive, or a hard paper copy. Please ask me if you are writing something and would like assistance in appropriate ways to cite previously published work. That's one great reason to schedule an office hour appointment! For info and useful links, visit the Rutgers Academic Integrity Policy (http://academicintegrity.rutgers.edu/)

Should copying occur, both the student who copied work from another student and the student who gave material to be copied could both automatically receive a zero for the assignment. Penalty for violation of the University Code of Student Conduct can also be extended to include failure of the course and University disciplinary action. The risk really isn’t worth it.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examination will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

**Accommodations For Students With Disabilities**

In compliance with the Rutgers University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first two weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are encouraged to register with the RU Office of Disability Services to verify their eligibility for appropriate accommodations and provide me with appropriate documentation.

https://ods.rutgers.edu/
http://health.rutgers.edu/

**Health and Wellness**

http://health.rutgers.edu/

**Diversity/Inclusivity Statement**

We understand that our members represent a rich variety of backgrounds and perspectives. The Psychology Department is committed to providing an atmosphere for learning that respects diversity. While working together to build this community we ask all members to:

- share their unique experiences, values and beliefs
- be open to the views of others
- honor the uniqueness of their colleagues
- appreciate the opportunity that we have to learn from each other in this community
- value each other’s opinions and communicate in a respectful manner
• use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the Rutgers University community

Course Requirements

General course requirements/notes:

1. **CANVAS.** It is expected that all students will regularly access CANVAS for course announcements and materials. Please also make sure that you check your Rutgers email regularly.

2. **University e-mail accounts** should be checked at least daily by the student because this will be the primary means for sending information to the class or contacting individual students. Failure to monitor your e-mail effectively is not an excuse for not having course information or for not following up on course issues in a timely manner.

3. **Regular access to a computer** with Internet.

4. **Attendance.** Attending class is essential to the learning process. Please don’t be late to class and be in attendance every time. Regular class attendance is expected. Our time is short and swift in this face-paced format. If you miss a class meeting, you will still be responsible for material covered in class. We have approximately (15 weeks * 2 classes/week = 30 class meetings). If you miss or are late:

   - to 10% of the class you will not achieve more than a B+ in this class (~3 classes)
   - to 15% of the class you will not achieve more than a B in this class (~5 classes)
   - to 20% of the class you will not achieve more than a C+ in this class (~6 classes)
   - to 25% of the class you will not achieve more than a C in this class (~8 classes)
   - to 30% of the class you will not achieve more than a D in this class (~9 classes)

5. **Late assignments.** Assignments not handed in before the beginning of lecture at 2:00pm are considered LATE – no exceptions! Submitting your work any time after this on the same day will result in a 10% penalty. Each day after will result in a further 20% penalty.

6. If you are not performing as well as you would like it is your **responsibility to meet with me.** I am here to help you learn.

**Exams And Other Assessments**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background, Basic Statistics, R</td>
<td>20%</td>
</tr>
<tr>
<td>Stroop (QALMRI, group discussion, experiment)</td>
<td>10%</td>
</tr>
<tr>
<td>Research Methods (EEG, fMRI, Eye Tracking, AI, MTurk: QALMRI, participation)</td>
<td>50%</td>
</tr>
<tr>
<td>PsychoPy/Experimental Design /Blog Posts /CANVAS assignments</td>
<td>20%</td>
</tr>
</tbody>
</table>

Exam Period [https://finalexams.rutgers.edu/](https://finalexams.rutgers.edu/)

Final grades will be determined by the following (standard Rutgers grading scale):

- 90.00 % and above A
- 85.00-89.99% B+
- 80.00-84.99% B
- 75.00-79.99% C+
- 70.00-74.99% C
- 60.00-69.99% D
- below 60.00% F
**Make-Up Policy**
No make-up assignments will be given unless arrangements are made prior to the day of the exam/assignment due date or written proof of unavoidable absence is provided (e.g., doctor’s note; religious and intercollegiate athletics absences). If exceptional circumstances prevent you from completing an assignment (e.g., car accident), it is important that you contact the instructor within 24 hours. In some circumstances without a documented but still valid reason for your absence on an assignment day, you may take a make-up with a 10-90% deduction in points (at the instructor’s discretion).

**Changing Grades**
Students sometimes ask professors to change final grades, usually based on the need to achieve a certain grade in order to, for example, get into the business school, retain a scholarship, or avoid academic probation. Although I wish all of you the best of success in your studies, you hopefully can understand how changing one student's grade is unfair to the other students in the class. Therefore, requests for exam score or grade changes will not be entertained. Your final grade will be based solely on the your efforts as reflected in the course assessments.

**Schedule of Course Topics**
Note: Supplemental materials will be posted on Canvas throughout the semester. Schedule subject to revision.

**PART I Background, Basic Statistics, R:**
Week 1 1/18/2023 Fundamentals of Science and How We Study the Brain
Week 2 1/23/2023 Fundamentals …. continued
Week 3 1/30/2023 Basic Statistics, R
Week 4 2/06/2023 Basic Statistics, R

**PART II QALMRI:**
Week 5 2/13/2022 The QALMRI Method
5.1 The QALMRI Method
5.2 Writing a QALMRI
5.3 Example QALMRI
5.4 Finding the QALMRI sections in a journal article
5.5 The Hardest Section of the QALRMI: Alternatives
5.6 Read, summarize and discuss the paper by Raz et al. (2006)
5.7 PsychoPy/Stroop

**PART III Research Methods:**
Week 6 2/20/2023 Ethics in research (CANVAS based assignments)
- Ethical considerations in research with human subjects
Week 7 2/27/2023 Amazon Mechanical Turk/ Running experiments online
Week 8 3/06/2023 Neuroscience (QALMRI/Participation/Analysis)
- Eye Tracking (March 8th Dr. Geller)
Week 9 3/13/2023 Spring Recess
Week 10 3/20/2023 Neuroscience (QALMRI/Participation/Analysis)
- Overview of brain imaging techniques
- Methodological and conceptual issues in brain imaging
- fMRI analysis
- ERPs analysis

Week 11  3/27/2023  Neuroscience - continued
Week 12  4/03/2023  Artificial Intelligence (QALMRI)
            - Research methods in AI
            - Machine learning

**PART III Design Your Own Experiments:**

Week 13  4/17/2023  PsychoPy –Experimental Design- thought or Actual
Week 15  4/24/2023  PsychoPy - Experimental Design- thought or Actual
Week 16  5/01/2023  Presentations (QALMRI feedback to presenters)

**Other Dates/Final:**

Reading Days       Tuesday, May 2; Wednesday May 3
Spring Exams Begin  Thursday, May 4
Spring Exams End    Wednesday, May 10