



Graduate School of Applied and Professional Psychology (GSAPP)  
Rutgers University  
New Brunswick, New Jersey  
Spring 2025

Biological Bases of Behavior  
18:844:507:01  
Credits: 3  
Level: Graduate  
Wednesdays 3:35 pm to 6:05 pm

Instructor: Joshua Cohen, Ph.D.  
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Office Hours: 2 pm on Wednesdays or by appointment  
Office: In the Rutgers Center for Adult Autism Services (RCAAS) or Zoom

I will make every reasonable effort to meet with students whenever necessary. Before or after class is a good option. We may also set up a phone meeting.

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**Rutgers University Mission:** As the premier comprehensive public research university in the state's system of higher education, Rutgers, The State University of New Jersey, has the threefold mission of

- providing for the instructional needs of New Jersey's citizens through its undergraduate, graduate, and continuing education programs;
- conducting the cutting-edge research that contributes to the medical, environmental, social, and cultural well-being of the state, as well as aiding the economy and the state's businesses and industries; and
- performing public service in support of the needs of the citizens of the state and its local, county, and state governments.

Each component of the university's mission reinforces and supports the other two. As the University of New Jersey®, Rutgers is dedicated to teaching that meets the highest standards of excellence, to conducting research that breaks new ground, and to providing services, solutions, and clinical care that help individuals and the local, national, and global communities where they live.

**GSAPP Mission:** The mission of GSAPP is threefold: education, research/scholarship, and public service. Its goal is to prepare well-educated, qualified, and competent direct-service psychologists who have a special commitment to direct community involvement and to underserved populations--professionals who can integrate scientific knowledge with innovation in the delivery of psychological services to individuals, families, groups, and

organizations. Professionals receiving a master's or doctoral degree in psychology should be capable of extending psychological knowledge and exhibiting the high level of analytic skills and theoretical understanding needed to use existing and emerging psychological knowledge.

Core Values. We are guided by four core values that are apparent in our learning environment, centers, and clinics:

1. **Academic excellence** in preparing students for careers in clinical and school psychology.
2. Commitment to **social justice** and helping **underserved populations**.
3. **Diversity** of students trained, approaches used, theoretical orientations followed, and populations served.
4. **Knowledge generation and dissemination** using contemporary research approaches.

**MAP Statement:** The program embraces the mission of the school by offering instruction that has an emphasis on civic and global citizenship, social justice and cultural diversity. This course of study provides students with knowledge needed to understand individual and collective behaviors; develop quantitative and qualitative statistical analysis and research design needed to analyze the corresponding physical and environmental contributors to human behavior; and a beginning understanding of the analysis and treatment of behavior problems and disorders.

The MAP degree will prepare students with the requisite theoretical knowledge; critical thinking and problem solving skills needed to successfully participate in employment or scholastic activities. Students will have opportunities to pursue scholarly activities that prepare them to successfully compete for admissions into doctoral level psychology and related academic programs, and pursue Master's level career pathways through available concentration and certificate programs (see examples of concentration areas listed below). In addition to completing the required coursework (36 credits), completion of the MAP degree will be marked by a culminating academic experience—Capstone project (either a research project/presentation (3 credits) and experiential learning activity (6-credit practicum training). In general, students will acquire a knowledge base grounded in psychological theory and experiential learning (research or practicum) designed to further advance their personal and professional career development.

### **Course Description/Overview:**

In today's healthcare climate, psychologists, behavior analysts, and psychometrists are often required to serve beside medical personnel in integrated healthcare teams for assessment and treatment of complex cases. This course will prepare students for these interactions by providing them with a comprehensive overview of key aspects of biology that explain or otherwise interface with normal and/or dysfunctional behavior.

Scientific constructs, techniques, and theories will be examined in depth. Biological topics include the peripheral and central nervous system, the neurobiological systems that underlie sensation, motor behavior, emotion, cognition, self-other representation, and social behavior. We will also integrate understanding of altered behavioral processes of

brain-damaged and psychiatric patients with knowledge of basic neuronal and neurobiological processes.

### **OBJECTIVES FOR THE COURSE:**

After this course, you should be able to:

- Demonstrate an understanding of the neuron, brain organization, and functional neuroanatomy
- Understand the biological processes that underlie sensation, perception, memory, emotion, motor behaviors, language, sleep/dreaming, and psychopathology
- Integrate basic biological processes with single case studies in neurology, neuropsychology, and clinical psychology
- Integrate understanding of neurobiological processes into understanding normal and abnormal mental and behavioral functioning
- Demonstrate verbal and written comprehension of basic biological concepts across all domains listed within the course content/schedule

### **Assignments and Evaluation Method:**

|                                  |     |
|----------------------------------|-----|
| Mid-Term Exam                    | 25% |
| Final Exam (cumulative)          | 25% |
| Attendance / class participation | 25% |
| Homework                         | 25% |

### **Homework:**

The homework questions are based on the readings assigned for the upcoming class. Homework will be assigned directly in Canvas. They are due by the end of the day on the day of class.

### **Grades and Grading Policy**

| Grade | Description        | Numerical Equivalent                                       |
|-------|--------------------|--|
| A     | Outstanding        | 89.5 -100 (4.0)  |
| B+    | Intermediate Grade | 87-89.4 (3.5)  |
| B     | Good               | 79.5-86 (3.0)  |
| C     | Average            | 69.5-79.4 (2.0) Grades of C do not count toward graduation |
| F     | Failure            | 69.4 or below (0.0)  |
| INC   | Incomplete         |  |
| S     | Satisfactory       |  |
| U     | Unsatisfactory     |  |
| PA    | Pass               |  |
| NC    | No credit given    |  |

**Program requirement:** All MAP and Graduate Certificate in ABA students must achieve a grade of B or better and maintain a GPA of 3.0, or academic remediation will be enforced.

### Required Texts:

- Carlson, N.R., & Birkett, M.A. (2020). *Physiology of behavior*, 13th Edition. Boston, MA: Pearson.

*It is okay to use older editions of the Carlson & Birkett text. The more recent the edition, the better.*

### Optional Texts:

- Quock (2022). *Drugs and Behavior*. 2<sup>nd</sup> Edition  
A copy will be available on Canvas
  - <https://opentext.wsu.edu/biopsychological-effects-alcohol-drugs/front-matter/introduction/>

### Articles we will discuss:

Bo, K., Kraynak, T. E., Kwon, M., Sun, M., Gianaros, P. J., & Wager, T. D. (2024). A systems identification approach using Bayes factors to deconstruct the brain bases of emotion regulation. *Nature neuroscience*, 27(5), 975–987.

<https://doi.org/10.1038/s41593-024-01605-7>

Andrews, D. S., Diers, K., Lee, J. K., Harvey, D. J., Heath, B., Cordero, D., Rogers, S. J., Reuter, M., Solomon, M., Amaral, D. G., & Nordahl, C. W. (2024). Sex differences in trajectories of cortical development in autistic children from 2-13 years of age. *Molecular psychiatry*, 10.1038/s41380-024-02592-8. <https://doi.org/10.1038/s41380-024-02592-8>

Erritzoe, D., Godlewska, B. R., Rizzo, G., Searle, G. E., Agnorelli, C., Lewis, Y., Ashok, A. H., Colasanti, A., Boura, I., Farrell, C., Parfitt, H., Howes, O., Passchier, J., Gunn, R. N., Politis, M., Nutt, D. J., Cowen, P. J., Knudsen, G. M., & Rabiner, E. A. (2023). Brain Serotonin Release Is Reduced in Patients With Depression: A [<sup>11</sup>C]Cimbi-36 Positron Emission Tomography Study With a d-Amphetamine Challenge. *Biological psychiatry*, 93(12), 1089–1098. <https://doi.org/10.1016/j.biopsych.2022.10.012>

Jauhar, S., Cowen, P. J., & Browning, M. (2023). Fifty years on: Serotonin and depression. *Journal of psychopharmacology (Oxford, England)*, 37(3), 237–241.

<https://doi.org/10.1177/02698811231161813>

Moncrieff, J., Cooper, R. E., Stockmann, T., Amendola, S., Hengartner, M. P., & Horowitz, M. A. (2023). The serotonin theory of depression: A systematic umbrella review of the evidence. *Molecular Psychiatry*, 28(6), 3243–3256.

<https://doi.org/10.1038/s41380-022-01661-0>

Carré, J. M., & Archer, J. (2018). Testosterone and human behavior: the role of individual and contextual variables. *Current opinion in psychology*, 19, 149–153.

<https://doi.org/10.1016/j.copsyc.2017.03.021>

Aishworiya, R., Valica, T., Hagerman, R., & Restrepo, B. (2022). An Update on Psychopharmacological Treatment of Autism Spectrum Disorder. *Neurotherapeutics : the journal of the American Society for Experimental NeuroTherapeutics*, 19(1), 248–262.

<https://doi.org/10.1007/s13311-022-01183-1>

**Course Outline** (subject to changes):

- Week 1 (1/22): Overview of course, assignments, & texts  
Structure and Function of Cells of the Nervous System
- Assigned Readings
    - Carlson & Birkett Ch. 2 (Structure and Function of Cells)
- Week 2 (1/29): Structure of the Nervous System
- Assigned Readings:
    - Carlson & Birkett Ch. 3 (Structure of Nervous System)
- Week 3 (2/5) Neurotransmitters and Psychopharmacology
- Assigned Readings
    - Carlson & Birkett Ch. 4 Psychopharmacology
- Week 4 (2/12): Neurodevelopmental Disorders  
Assigned Readings
- Carlson & Birkett Ch 15
- Week 5 (2/19): Schizophrenia and Affective Disorders
- Assigned Readings
    - Carlson & Birkett Ch. 17 (Schizophrenia and Affective Disorders)
- Week 6 (2/26) Neurological Disorders (Virtual)
- Assigned Readings
    - Carlson & Birkett Ch. 16 Neurological Disorders
- Week 7 (3/5) Emotion
- Assigned Readings
    - Carlson & Birkett. Ch.11. (Emotion)
- Week 8 (3/12) Clinical exercise, Article Review, and Midterm Review (optional virtual)
- Articles will be chosen from above list
- Week 9 (3/26): **Midterm Examination**
- Week 10 (4/2): Language and Aphasias
- Assigned Readings

- Carlson & Birkett. Ch. 14. Human Communication

Week 11 (4/9): Movement Disorders / Hormones / emotion

- Assigned Readings
  - *Readings on Hormones to be determined*
  - Carlson & Birkett Ch. 9

Week 12 (4/16): Biology of Stress and Anxiety **RECORDED LECTURE; NOT IN PERSON**

- Assigned Readings
  - Carlson & Birkett. Ch.18. Stress and Anxiety

Week 13 (4/23): Substance Abuse

- Assigned Readings
  - Carlson & Birkett Ch. 19 (Substance Abuse)

Week 14 (4/30) Catch up, Article Review, Final Exam Review  
**Final Review**

Week 15 (5/7) **Final Examination**

### **Attendance and Participation:**

Attendance and class participation are a major part of this class. You are expected to attend all classes and arrive on time. *Only two (2) excused/unexcused absences are permitted. Missing more than 2 classes will result in a 5% point deduction for each additional day of absence from your final grade point.* If you are forced to miss an excessive amount of classes, you will be encouraged to withdraw from the class. Students who arrive to class more than 15 minutes after the class has started are considered tardy, and will be marked absent if they arrive more than 30 minutes after class has started. After 3 late arrivals, an unexcused absence will be marked in your record. The only excused absences are those that are serious or required (e.g., personal medical emergencies or serious illness/injury; death or serious illness in the family; military duties; jury duty). They will always require some form of documentation: Examples include a doctor's note (on letterhead and signed by the doctor; obituary or funeral program; court order/notice; etc.). You must always supply me with the original or a copy of your documentation, which I will keep on file. Only students with approved documentation can be given an excused absence.

### **Computer/Cell Phone Use in Class**

If students are expected to send or receive urgent e-mails, texts, or calls during class, their unanticipated and urgent needs should be communicated to and approved by the instructor prior to class. All cell phones should be turned off or in silent mode. All computing devices should be used only for the purpose of class-related activities.

### **Academic Integrity**

All Rutgers students should review and adhere to the University principles of academic integrity, available at: <http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers/>  
**APA Citation Style.** All papers MUST be written using the APA style (6 ed.).

### **Student Resources**

**For more information visit:** <https://gsapp.rutgers.edu/current-students/important-links>  
**Accommodations due to Disability**

If you seek accommodations due to a documented disability, you may arrange for these through the Office of Disability Services, Kreeger Learning Center, 151 College Avenue; [dfoffice@rci.rutgers.edu](mailto:dfoffice@rci.rutgers.edu) or you can visit:

<https://ods.rutgers.edu/students/documentation-guidelines>.

**Title IX:** <http://compliance.rutgers.edu/resources/resources-for-facultystaff/>

**Counseling services.** Students often experience personal problems or difficulties during the term that may interfere with learning and their daily activities. If you or someone you know needs to talk to someone regarding such personal issues, the University provides free counseling services through the Counseling and Psychological Services (CAPS) and their information can be found at: <http://psychologicalservices.rutgers.edu>. They also offer a number of useful workshops for general stress management and techniques for promoting mental health. If you have any questions about CAPS or other services, I am happy to speak with you privately.