

LIFE SCIENCE: BRAIN AND BEHAVIOR
(CORE-UA.306)
INFORMATION AND SYLLABUS

This CORE course satisfies the Natural Science II requirement.

OVERVIEW

Brain and Behavior explores the biological basis of our minds and what we observe that they can do. The course assumes that all experience, whether it is sensed or perceived, whether a thought, an emotion, or an imagination, it all is possible to explain as the result of the biological, machine-like operations of the physical brain.

While there are many more questions than answers, the course will provide you with a biological, physically-grounded way to think about yourself, what and how you experience life, and provide an intellectual framework for understanding and explaining individual and collective experience.

LECTURE DAYS AND TIMES

9:30 - 10:45 ET, Tuesdays and Thursdays, In-person in SILVER 207, Lectures broadcast and recorded on zoom.

Access via NYU BRIGHTSPACE for the best experience.

URL: <https://nyu.zoom.us/j/95086131272?pwd=S0FSY2VYQ3B6WmF3STNuOGJ0ZWxkZz09>

Passcode: thinkbrain

ATTENDANCE AT LECTURES IS MANDATORY

You are responsible for the material covered in the lectures, a good proportion of which is not in the textbook.

LAB SECTIONS AND TAs (participation in laboratories is mandatory)

Section 002	Tuesday 15:30 - 16:45	Dr. Grau-Perales
Section 003	Tuesday 16:55 - 18:10	Dr. Grau-Perales
Section 004	Wednesday 9:30 - 10:45	Dr. Grau-Perales
Section 005	Wednesday 11:00 - 12:15	Dr. Alexandrescu
Section 006	Wednesday 12:30 - 13:45	Dr. Alexandrescu
Section 007	Wednesday 14:00 - 15:15	Dr. Alexandrescu

The labs are designed to give you hands-on experience that is relevant to the class material. This should facilitate understanding the lecture material and provide deeper understanding of the lecture material and concepts, which can seem abstract. The labs also give you an opportunity to experience how science works, that it is a creative interpretative process that requires meticulous attention to detail as well as integrating information and observations into concepts. You will write up each lab, which documents the lab experience, record notes, and expresses ideas. Some labs will use animal tissue or

living animals. Lab reports must be submitted to your TA before the start of the next lab session or in one week if there is no scheduled lab.

LABS PRIOR TO EXAMS HAVE BEEN DESIGNATED AS REVIEW SESSIONS. These times have been allocated to provide you with an extra opportunity to review material and clarify understanding of the course material.

COURSE POLICY ON LAB ATTENDANCE

Performing experiments and analyzing data are central to scientific inquiry. For this reason, the lab component of the course is an essential part of your learning experience. You are required to attend all lab sessions during the semester and arrive on time according to the lab schedule. According to NYU policy, attendance exceptions are made for religious observances. If you miss a lab because of illness, you are required to provide documentation in the form of a medical note. The importance of the lab experience means that repeated absences will result in a failing grade for the course.

REQUIRED TEXTS

1) LIFE SCIENCE: BRAIN AND BEHAVIOR Lab Manual – access via BRIGHTSPACE

2) The Mind's Machine – Foundations of Brain and Behavior
Watson and Breedlove. Oxford University Press, 2019, Fourth Edition

This course is participating in the Follett Access program. This is an NYU Bookstore initiative that delivers required course materials at the lowest possible price.

The book, Mind's Machine will be delivered to you digitally. The cost of the book is \$47.25, which will be added as a "book charge" to your bursar bill, this is a savings of \$103.69 over the publisher's price.

If you decide not to use this digital edition you can opt-out of the program. The deadline for opting out is September 17th. If you don't opt out by this date you will be charged.

The link to opt out of the program is:

<https://includedcp.follett.com/2015>

Information you should know to access the textbook materials:

- Your user name is your school email address.
- Once you have opted out of a course, you cannot opt back in!

Questions? Contact the bookstore:

email - wsq.text@nyu.edu

phone - 212-998-4656

CLASS WORK AND HOMEWORK

You will be assigned readings, podcasts or movies on topics of interest from the media and there will be short quizzes or the assignments in lecture that will contribute to your course grade.

EXAMS

There will be three exams (2 midterm exams and a cumulative final exam). The questions will be based on material from the lectures and assigned readings. Questions will be multiple choice, fill-in the blank, short answer, simple drawing, and short essay types.

NOTE THE EXAM DATES ON THE SYLLABUS. THERE ARE NO MAKEUP EXAMS. If you miss a midterm exam, the grade on the final will count proportionately more.

GRADING

Grades will be determined according to the following breakdown:

20% Midterm Exam 1

20% Midterm Exam 2

30% Final Exam

25% Labs

5% Classwork and Homework

ACADEMIC INTEGRITY

Students must adhere to NYU's principles of [academic integrity](#), and the CAS [Honor Code](#).

Academic integrity means that all of the work that you submit is original.

Violations of academic integrity include:

- Cheating on exams, quizzes, or other graded assignments
- [Plagiarism](#): appropriating the ideas, words or images of others
- Fabrication or falsification of data

Consequences of a single violation of the principles of academic integrity are a grade of F on the scored assessment, and a formal report to the Dean's Office. The grade of F must be factored into the course's final grade.

If you have any uncertainty about academic integrity, ask Prof. Fenton at the start of the semester.

CONTACT INFORMATION

Professor

Dr. André Fenton

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OFFICE HOURS

Tuesdays 12:00-1:30 ET (except Sept. 28,) Meyer Room 980
Thursdays 22:30-midnight ET
URL: <https://nyu.zoom.us/my/aafenton>

Teaching Assistants
Dr. Anamaria Alexandrescu
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SYLLABUS

MY PLEDGE TO YOU: I will be brave enough to have uncomfortable conversations and take action against racism at NYU.

WEEK 1

2-Sep Lecture 1. Introduction: Brain and behavior an intimate couple (integrating across levels and scales of complexity)
Reading: Chapter 1

WEEK 2

7-Sep Lecture 2. Structure and Function: Brain – world relationships, on time, clocks and clockwork
Reading: Kelemen and Fenton

7/8-Sep Lab 1. The Scientific Method

9-Sep Lecture 3. Bioelectricity: Electric meat (fat, water and salt)
Reading: Chapter 2 p. 54-59

WEEK 3

14-Sep Lecture 4. Neural communication I: The exciting electrical language of neurons
Reading: Chapter 2 p. 59-66

14/15-Sep Lab 2: Electrical Potential in Neurons I: A Model Dendrite

15-Sep [Drop/Add deadline and deadline to opt out of the electronic textbook program. Login to the student portal to opt out of having the course materials provided to you.](#)

16-Sep Lecture 5. Neural communication 2: Synapses – connections, networks and influence
Reading: Chapter 2 p. 67-75

WEEK 4

21-Sep Lecture 6. Neural communication 3: Synapses - circuits and networks for drug deals
Reading: Chapter 3 p. 83-101

21/22-Sep Lab 3: Electrical Potential in Neurons II: Simulating bioelectricity

23-Sep Lecture 7. Hormones and Sex - action at a distance
Reading: Chapter 8 p.245-261

WEEK 5

28-Sep Lecture 8. Neurodevelopment or how to build something really complicated
Reading: Chapter 4 p.121-135

28/29-Sep Lab 4: Neuronal Recording of Action Potentials

30-Sep Lecture 9. Stepping back: Evolution or Animals are people models too
[Reading/Viewing: https://www.youtube.com/watch?v=fgQLyqWaCbA](https://www.youtube.com/watch?v=fgQLyqWaCbA)

WEEK 6

5-Oct Lecture 10. Review material for the midterm exam (lectures 1-9).

5/6-Oct Lab: Review to prepare for midterm exam

7-Oct Midterm Exam 1

WEEK 7

12-Oct MONDAY SCHEDULE - NO LECTURES or LABS

12/13-Oct OPTIONAL LAB REVIEW SESSION

14-Oct Lecture 11. Sensation and touching in your head 1
Reading: Chapter 5 p.143-149

WEEK 8

19-Oct Lecture 12. Sensation and touching in your head 2
Reading: Chapter 5 p.149-160

19/20-Oct Lab 5: Organization of the Brain I: Neuron to brain

21-Oct Lecture 13. Seeing and perceiving: how brains see 1
Reading: Chapter 7 p.211-222

WEEK 9

26-Oct Lecture 14. Seeing and perceiving: how brains see 2
Reading: Chapter 7 p.222-230

26/27-Oct	Lab 6. Organization of the Brain II: Dissection of the Sheep Brain
28-Oct	Lecture 15. Ear hairs – Hearing Reading: Chapter 6 p. 177-193
WEEK 10	
2-Nov	Lecture 16. Even more ear hairs – Balance and equilibrium Reading: Chapter 6 p. 194-196; Fenton Notes on the Vestibular system
2/3-Nov	Lab 7: Vision
4-Nov	Lecture 17. Moving, how complicated could it be? Reading: Chapter 5 p.161-173
WEEK 11	
9-Nov	Lecture 18. Neural representation and computation Reading: Where Am I? Where am I Going? By May-Britt and Edvard Moser, Scientific American 2016, 314:26-33
9/10-Nov	Lab: Review to prepare for midterm exam
11-Nov	Lecture 19. Review material for the midterm exam (lectures 11-17)
WEEK 12	
16-Nov	Midterm Exam 2
16/17-Nov	Lab 8. Observing Behavior of C. elegans
18-Nov	Lecture 20. Representing experience: Attention, ‘truthiness’ and the learning and memory process Reading: Chapter 14 p.435-443,446-447, 419-420
WEEK 13	
23-Nov	Lecture 21. Memory 1: Amnesia, memory and the learning process Reading: Chapter 13 p.407-418
23/24-Nov	REMOTE PARTICIPATION - LAB REVIEW SESSION
25-Nov	Thanksgiving Break – no classes
WEEK 14	
30-Nov	Lecture 22. Memory 2: Synaptic and molecular plasticity

Reading: Chapter 13 p.420-431

30-Nov/1-Dec Lab 9. Genetically Manipulating Behavior of C. elegans

2-Dec Lecture 23. Memory 3: Persistent storage
Reading: Reading assignment: NYT piece on PKMzeta: "Focusing on a memory molecule"

6-Dec Last day to withdraw from courses

WEEK 15

7-Dec Lecture 24. Neurotypical and Neurodiverse: what is brain dysfunction?
Reading: Spectrum Viewpoint: "How a 'pacemaker' for the brain could ease autism traits"

7/8-Dec Lab: Review to prepare for final exam

9-Dec Lecture 25. Mental Illness and brain dysfunction
Reading: Chapter 12.

WEEK 16

14-Dec Lecture 26. What we think, we become – A neuroscientist's perspective

Final Exam date: TBD