

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

This CORE course satisfies the Natural Science II requirement.

LECTURE DAYS AND TIMES

9:30 - 10:45, Tuesdays and Thursdays, Room 207 Silver Building.

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)

Room 201 Silver Building

Section 003	Thursday 1:00 - 2:40	Monica Lewin
Section 004	Thursday 3:00 - 4:40	Monica Lewin
Section 005	Thursday 5:00 - 6:40	Monica Lewin
Section 006	Friday 9:00 - 10:40	Pedro Herrero Vidal
Section 007	Friday 11:00 - 12:40	Pedro Herrero Vidal

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 handed in to your TA before the start of lecture on Tuesday.**

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.

REQUIRED TEXTS

The Mind's Machine – Foundation of Brain and Behavior

Watson and Breedlove. Sinauer, 2016, Second Edition

The textbook has online resources you should examine: <http://2e.mindsmachine.com>

For access, you will need to enter the instructor's email address: **afenton@nyu.edu**

LIFE SCIENCE: BRAIN AND BEHAVIOR Lab manual (available at the bookstore)

CLASS WORK AND HOME WORK

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

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

CONTACT INFORMATION

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SYLLABUS

Week 1

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

Reading: Chapter 1

6-Sep **Lecture 2.** Brain Organization 1: Structure and function - another intimate couple

Reading: Chapter 2

6/7-Sep **NO LABS**

Week 2

11-Sep **Lecture 3.** Bioelectricity: Electric meat (fat, water and salt)

Reading: Chapter 3 p. 50-55

13-Sep **Lecture 4.** Neural communication I: The exciting electrical language of neurons

Reading: Chapter 3 p. 55-61

13/14-Sep **Lab 1.** The Scientific Method

Week 3

18-Sep **Lecture 5.** Neural communication 2: Synapses – connections, networks and influence

Reading: Chapter 3 p. 62-70

20-Sep **Lecture 6.** Neural communication 4: Synapses - circuits and networks for exchanging drugs

Reading: Chapter 4 p. 78-95

20/21-Sep **Lab 2.** Sheep Brain Dissection

Week 4

25-Sep **Lecture 7.** Neural communication 3: Membrane Physiology Review

Reading: Review lectures 3-6

27-Sep **Lecture 8.** Neurodevelopment or how to build something really complicated

Reading: Chapter 13 p.393-407

27/28-Sep **Lab 3.** A model dendrite

Week 5

2-Oct **Lecture 9.** Hormones and Sex - action at a distance

Reading: Chapter 8 p.208-225

4-Oct **Lecture 10.** Stepping back: Evolution/Animals are models too

Reading: Reading Assignment,

Viewing: <https://www.youtube.com/watch?v=fgQLyqWaCbA>

4/5-Oct **Lab:** Review to prepare for midterm exam

Week 6

9-Oct No class: Legislative Day - Classes meet according to a Monday schedule

11-Oct Midterm Exam 1 (in class)

11/12-Oct **Lab 4.** Microscopy and Neuronal Visualization

Week 7

16-Oct **Lecture 11.** Sensation and touching in your head 1

Reading: Chapter 5 p.110-117

18-Oct **Lecture 12.** Sensation and touching in your head 2

Reading: Chapter 5 p.118-127

18/19-Oct **Lab 5.** Build your own brain

Week 8

23-Oct **Lecture 13.** Ear hairs – Hearing

Reading: Chapter 6 p. 146-161

25-Oct **Lecture 14.** Even more ear hairs – Balance and equilibrium

Reading: Chapter 6 p. 162-163; Fenton Notes on the Vestibular system

25/26-Oct **Lab 6.** Somatic sensation

Week 9

30-Oct **Lecture 15.** Seeing and perceiving: how brains see 1

Reading: Chapter 7 p.174-194

1-Nov **Lecture 16.** Seeing and perceiving: how brains see 2

Reading: Chapter 7 p.194-207

1/2-Nov **Lab 7.** Vision

2-Nov Take home PRACTICE Exam delivered vis CLASSES (due Nov. 6)

Week 10

6-Nov **Class: Review Practice Take home Exam**

8-Nov **Lecture 17.** Moving, how complicated could it be?

Reading: Chapter 5 p.126-143

8/9-Nov **Lab:** Review Exam to prepare for midterm exam

Week 11

13-Nov Midterm Exam 2 (in class)

15-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.

15/16-Nov **Lab 8.** Reaction time

Week 12

20-Nov **Lecture 19.** More of a good thing – adult neurogenesis

Reading: A Price to Pay for Adult Neurogenesis by Mongiat and Alejandro Schinder, Science 2014, 344:594-595.

22-Nov Thanksgiving Break – no classes

22/23-Nov Thanksgiving Break - No lab this week

Week 13

27-Nov **Lecture 20.** Attention

Reading: Chapter 14 p. 408 -421

29-Nov **Lecture 21.** Memory 1: Amnesia, memory and the learning process

Reading: Chapter 13 p. 368-383

29/30-Nov **Lab 9.** Action potentials in cockroach

Week 14

4-Dec **Lecture 22.** Memory 2: Synaptic and molecular plasticity

Reading: Chapter 13 p. 383-393

6-Dec **Lecture 23.** Memory 3: Persistent storage

Reading: Reading assignment: NYT piece on PKMzeta: “Focusing on a memory molecule”

6/7-Dec **Lab 10.** *C. elegans* behavior

Week 15

11-Dec **Lecture 24.** Sleep – active brain behavior

13-Dec **Lecture 24.** Mental Illness and brain dysfunction

Reading: Chapter 12, Reading assignment: NPR: “Halting Schizophrenia Before It Starts”

Spectrum Viewpoint: “How a ‘pacemaker’ for the brain could ease autism traits”

13/14-Dec **Lab:** Review to prepare for final exam. Do course evaluations

Final Exam 18-Dec 8:00 a.m. – 9:50 a.m. Room 207 Silver Building