This CORE course satisfies the Natural Science II requirement.

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.

**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**
The Mind’s Machine – Foundation of Brain and Behavior
The textbook has online resources you should examine: [http://3e.mindsmachine.com](http://3e.mindsmachine.com)

**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
SYLLABUS

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

Lecture 2. Brain Organization 1: Structure and function - another intimate couple
Reading: Chapter 2

Week 2
Lecture 3. Bioelectricity: Electric meat (fat, water and salt)
Reading: Chapter 3 p. 54-66

Lecture 4. Neural communication I: The exciting electrical language of neurons
Reading: Chapter 3 p. 66-70

Lab 1. The Scientific Method

Week 3
Lecture 5. Neural communication 2: Synapses – connections, networks and influence
Reading: Chapter 3 p. 70-80

Lecture 6. Neural communication 3: Synapses - circuits and networks for exchanging drugs
Reading: Chapter 4 p. 82-99

Lab 2. Sheep Brain Dissection

Week 4
Lecture 7. Neural communication 4: Membrane Physiology Review
Reading: Review lectures 2-6

Lecture 8. Neurodevelopment or how to build something really complicated
Reading: Chapter 13 p.402-417

Lab 3. A model dendrite

Week 5
Lecture 9. Hormones and Sex - action at a distance
Reading: Chapter 8 p.216-234

Lecture 10. Stepping back: Evolution/Animals are models too
Reading/Viewing: https://www.youtube.com/watch?v=fgQLyqWaCbA

Lab 4. Microscopy and Neuronal Visualization

Week 6
Lecture 11. Sensation and touching in your head 1
Reading: Chapter 5 p.118-129

Lecture 12. Sensation and touching in your head 2
Reading: Chapter 5 p.129-136

Lab 5. Somatic sensation

Week 7
Lecture 13. Review material on midterm exam.

Lab: Review to prepare for midterm exam

Week 8
Midterm Exam 1 (in class)

Lecture 14. Ear hairs – Hearing
Reading: Chapter 6 p. 152-168

Build your own brain

Week 9
Lecture 15. Even more ear hairs – Balance and equilibrium
Reading: Chapter 6 p. 169-171; Fenton Notes on the Vestibular system

Lecture 16. Seeing and perceiving: how brains see 1
Reading: Chapter 7 p.182-194

Lab 7. Vision

Week 10
Lecture 17. Seeing and perceiving: how brains see 2
Reading: Chapter 7 p.194-202

Lecture 18. Moving, how complicated could it be?
Reading: Chapter 5 p.136-150

Lab 8. Reaction time

Week 11
Lecture 19. Neural representation and computation

Lecture 20. Representing experience: Attention, ‘truthiness’ and the learning and memory process
Reading: Chapter 14 p.418-432

Lab: Review to prepare for midterm exam
Week 12
Midterm Exam 2 (in class)

Lecture 21. Memory 1: Amnesia, memory and the learning process
Reading: Chapter 13 p.378-391

Lab 9. Action potentials in cockroach

Week 13
Lecture 22. Memory 2: Synaptic and molecular plasticity
Reading: Chapter 13 p.392-402

Week 14
Lecture 23. Memory 3: Persistent storage
Reading: Reading assignment: NYT piece on PKMzeta: “Focusing on a memory molecule”

Lecture 24. Sleep – active brain behavior
Reading: Chapter 10 p.297-316

Lab 10. C. elegans behavior

Week 15
Lecture 25. Mental Illness and brain dysfunction 1
Reading: Chapter 12, Reading assignment: NPR: “Halting Schizophrenia Before It Starts”

Lecture 26. Mental Illness and brain dysfunction 2
Spectrum Viewpoint: “How a ‘pacemaker’ for the brain could ease autism traits”

Lab: Review to prepare for final exam. Do course evaluations

Final Exam