

Natural Science II: Brain and Behavior

V55.0306 (001)

Prof. Paul Glimcher
4 Washington Place, 809

Lectures

Monday and Wednesday 2:00pm-3:15pm
Silver 207

Labs:

002: Wednesday 5:00-6:40	201 Silver
003: Thursday 9:00-10:40	201 Silver
004: Thursday 11:00-12:40	201 Silver
005: Thursday 1:00-2:40	201 Silver
006: Thursday 3:00-4:40	201 Silver
007: Thursday 5:00-6:40	201 Silver

TA:

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Texts

Required:

Biological Psychology. Rozenzweig, Breedlove and Leiman. Sinauer Associates.
(Either the third, fourth or fifth editions, not the second!)

Lab Manual, available at the bookstore

Recommended, particularly for those who feel that their biology background is shakey: How
The Brain Works. Mark Wm. Dubin. Blackwell Science.

Grading

Exams:

Midterm 25%

Final Exam 50%

Laboratory

Quizzes 5%

Lab Reports 20%

Course Syllabus

Week 1

Sept 5: NO CLASS

Lab: No Lab, First Week

Week 2

Sept 10 Introduction, The Enlightenment and the Birth of Neuroscience.
From Aristotle to Descartes and on to Sherrington and Cajal.

Readings: Chapter 1 (any edition)

Sept 12 Anatomy of Nervous System I: Cells

Readings: Chapter 2, 3rd ed. first half, 4th ed. second half
5th ed. pp 23-34

Lab: The Scientific Method

Readings: Lab manual, Lab 1, handed out in lab

Week 3

Sept 17 Anatomy of the Nervous System II: Gross Anatomy

Readings: Chapter 2, 3rd ed. second half, 4th ed. first half
5th ed. pp 34-48

Sept 19 Neurophysiology I: Ionic Batteries and Passive Conduction

Readings: Chapter 3, 3rd ed. pp 58-72; 4th ed. pp 60-78
5th ed. pp 59-74

Lab: Sheep Brain Dissection

Readings: Lab manual, **Lab 2**

Week 4

Sept 24 Neurophysiology II: The Action Potential

Readings: CD-ROM, Chapter 3, Do all exercises and study guides under:
"Electrical Signals are the Vocabulary of The Nervous System

Sept 26 Neurophysiology III: Synapses and Circuits

Readings: Chapter 3, 3rd ed. pp 73-85; 4th ed. pp78-89
5th ed. pp 75-82

Lab: Build Your Own Brain

Readings: Lab Manual, **Lab 3**

Week 5

Oct 1 Psychopharmacology I: Neurotransmitter Systems

Readings: Chapter 4, 3rd ed. pp 87-98; 4th ed. pp 90-102 (bottom).
5th ed. pp 89-97

Oct 3 Psychopharmacology II: Drugs

Readings: Chapter 4, 3rd ed. pp 100-115; 4th ed. pp102-119; 5th ed. pp95-116 (esp. first half).
CD-ROM 3rd. ed. Tutorial 4.1; 4th ed. Tutorial 4.3

Lab: Microscopic analysis of the Neuron

Readings: Lab manual, **Lab 4**

Week 6

Oct 8 No School, Columbus Day

Oct 10 Hormones in General

Readings: Chapter 5, 3rd ed. pp 117-130; 4th ed. pp123-136; 5th ed. pp119-132

Lab: Electronic Conduction Lab

Readings: Lab manual, **Lab 5**

Week 7

Oct 15 Specific Hormonal Systems

Readings: Chapter 5, 3rd ed. pp 131-146; 5th ed. pp132-148. CD-ROM Tutorial 5.1; 4th ed.
pp136-151 CD-ROM Tutorial 5.2

Oct 17 Evolution of the Brain and Behavior

Readings: Chapter 6 (any edition)

Lab: Sensory Perception I: Response Times in the Nervous System

Readings: Lab manual, **Lab 6**

Week 8

Oct 22 Genetics and the Gross Anatomical Development of the Brain

Readings: Chapter 7, 3rd ed. pp 177-194; 4th ed. pp183-197 (bottom); 5th ed. 181-202.

Oct 24 Experience and the Fine Structure of the Brain

Readings: Chapter 7, 3rd. ed. pp 194-210; 4th ed. pp197-214; 5th ed. pp202-214.

Lab: Review for Midterm

Week 9

Oct 29 Midterm Exam

Oct 31 General Principles of Sensory Systems: Pain and Touch

Readings: Chapter 8

Lab Sensory Perception II: Somatic Sensation

Readings: Lab manual, **Lab 7**

Week 10

Nov 5 Hearing and Vestibular Sensation

Readings: Chapter 9, 3rd ed. pp 247-268; 4th ed. pp249-269; 5th ed. 249-267

Nov 7 The Chemical Senses, Taste and Smell

Readings: Chapter 9, 3rd ed. pp 269-279; 4th ed. 269-280; 5th ed. 270-283.

Lab: Sensory Perception III: Structural Limits of Vision

Readings: Lab manual, **Lab 8**

Week 11

Nov 12 Vision, The Sense We Really Understand: Retina to Cortex

Readings: Chapter 10, 3rd ed. pp 281-298; 4th ed. pp 283-299; 5th. ed. 285-302

Nov 14 Vision, The Sense We Really Understand: The Cortex and Perception

Readings: Chapter 10, 3rd ed. pp 298-321; 4th ed. 299-319; 5th ed. pp302-319.

Lab: Electrophysiology of the Roach Leg

Readings: Lab manual, **Lab 9**

Week 12

Nov 19 Movement Control: Sherrington, Descartes and Simple Circuits

Readings: Chapter 11, 3rd ed. pp 324-338; 4th ed. pp 321-332; 5th ed. 321-332.

Nov 21 Movement Control II: Cortical Systems

Readings: Chapter 11, 3rd ed. pp 338-358; 4th ed. 332-351; 5th ed. 332-342.

No Lab: Thanksgiving Vacation

Week 13

Nov 26 Movement Control III: The Sociology of Science, A Case Study

Asanuma, Evarts and Georgopolus

Readings: Chapter 11, 3rd ed. pp 338-358; 4th ed. 332-351; 5th ed. pp342-351.

Nov 28 General Theories of Emotion

Readings: Chapter 15, Read it all but with an emphasis on 3rd ed. pp 469-483; 4th ed. pp 459-470; 5th ed. pp451-466.

Lab: Behavioral Studies: Rats in Open Field Environments

Readings: Lab manual, **Lab 10**

Week 14

Dec 3 The Study of Fear

Readings: LeDoux Scientific American Article – from website

Dec 5 Learning and Memory I: Memory Systems of the Brain

Readings: Chapter 17, emphasis on 3rd ed. pages 537-555; 4th ed. pages 523-539; 5th ed. pp 513-531

Lab: Review for Final Exam

Week 15

Dec 10 Learning and Memory II: Hebb and LTP

Readings: Chapter 18, emphasis on 3rd ed. pages 571-589. 4th ed. pages 553-568; 5th ed. pp 543-559. CD-ROM Tutorial (3rd) 18.1; (4th) 18.2

Dec 12 The Neurobiology of Love

Readings: None

Dec 14 - 21: Final Exam Period