

**NATURAL SCIENCE II:
The Brain: A User's Guide**

**CORE-UA.313
Fall 2015**

**Monday and Wednesday 12:30 to 1:45 PM
Silver Building, Room 207
100 Washington Square East**

Professor Efrain Azmitia

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Office Hours: By email appointment



1. Course Description

The Human Brain is the most complex system in the universe. Despite the central position it has in nearly every aspect of our daily lives, it remains to many a mystery. How does it work? How can we care for it? How long will it function? This MAP course is designed to provide answers to these questions, and many more at an academic level accessible to the non-scientist student, and of interest to the scientist with little exposure to neuroscience.

The aims of the course are to provide the student with a firm foundation in what the brain looks like and what each of the parts do. To accomplish this, we will learn about the functions of the cortex in higher learning and memory, as well as discuss the basic work of the brainstem in regulating the internal environment of the body. The importance of nutrition on neurotransmitter synthesis, the function of sleep on memory and why we need so much of it, and the effects of alcohol and drugs on brain harmony and the meaning of addiction will be some of the points covered in this course. We will look at brain development and the special needs of children, as well as brain aging and illness and the difficulty of helping.

The laboratories are designed to provide hands-on experience in exploring the structure of the brain as well as learning how to measure brain functioning. We will provide specially prepared slides so the student can recognize a neuron and differentiate a dendrite from an axon. The molecular shape of neurotransmitter will be covered, as well as learning how to measure alcohol and determining its levels in your body.

It is expected that by the end of the course, the student will be familiar with the biological basis of brain structure and function, and not only be able to detect how a normal brain works, but also how to help keep it healthy.

Teaching Assistants

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2. Course Objectives

- To acquire an understanding of the biological complexity and dynamics of the brain.
- To understand the basis of learning and memory, and how to maximize our performance.
- To develop skills in problem solving and interpreting scientific information.
- To engage in various methods of scientific investigation in the laboratory.
- To critically evaluate popular media reports in neuroscience research.
- To address the complex ethical, social and legal consequences of mental illness

3. Course Texts and Readings

Required: Notes for lectures will be available on Black Board several days before the lecture. Please download and bring to class. The final lecture power point will be uploaded after the class. The final PowerPoint will be used for examination questions.

Background material for the course can be obtained from: Digital

Nimh.nih.gov (National Institute of Mental Health)

Drugabuse.gov (National Institute on Drug Abuse)

ncbi.nlm.nih.gov/pubmed (Peer reviewed articles)

Wikipedia.com (Uneven but usually reliable)

Print: Neuroscience: Exploring the Brain (Neuroscience) by Mark F Bear et al (Textbook) any edition

4. Lecture, Reading, and Laboratory Schedule

<u>Date</u>	<u>Lecture/Laboratory</u>	
W	Sept. 2	Introduction
	<u>Sept 3/4 No Lab</u>	
M	Sept. 7	Labor Day: No Class
W	Sept. 9	Development Brain Anatomy
	<u>Sept. 10/11 Lab 1: Sheep Brain Dissection 1</u>	
M	Sept. 14	Neuron Glial Cells
W	Sept. 16	Transmission
	<u>Sept. 17/18 Lab 2: Sheep Brain Dissection 2</u>	
M	Sept. 21	Motor Sensory Pain
W	Sept. 23	Test 1
	<u>Sept. 24/25 Lab 3: Microscopy</u>	
M	Sept. 28	Chemical Senses
W	Sept. 30	Eye and Vision
	<u>Oct. 1/2 Lab 4: Chemical Sensations * Paper I is Due</u>	
M	Oct. 5	Auditory, Music
W	Oct. 7	Global Systems
	<u>Oct. 8/9 Lab 5: Morphometrics</u>	
T	Oct. 13*	Memory
W	Oct. 14	Test 2
	<u>Oct. 15/16 Lab 6: Photosynthesis</u>	
M	Oct. 19	Research Day: Pick Topic
W	Oct. 21	Nutrition, Eating and Obesity
	<u>Oct. 22/13 Lab 7: Measuring Calories</u>	
M	Oct. 26	Sleep Rhythms
W	Oct. 28	Limbic System, Stress & Anxiety
	<u>Oct 29/30 Lab 8: Scientific Method</u>	
M	Nov. 2	Hormones, Sex and Gender
W	Nov. 4	Aggression & Testosterone
	<u>Nov. 5/6 Lab 9: Measuring Alcohol</u>	
M	Nov. 9	Test 3
W	Nov. 11	Alcoholism
	<u>Nov. 12/13 Lab 10: Molecular Structures of Neurotransmitters</u>	

M Nov. 16 Drugs of Abuse: Addictive
 W Nov. 18 Marijuana
Nov. 19/20 Lab 11: Tests and Rating Scales for Depression

M Nov. 23 Psychedelics
 W Nov. 25 Take Home Assignment: Movie on Depression
Nov 26 Thanksgiving: NO LAB

M Nov.30 Test 4
 W Dec. 2 Schizophrenia (Language)
Dec. 3/4 Lab 12: Diagnosis using the DSM-V *Paper II Due

M Dec. 7 Developmental Disorders (Autism, ADHD)
 W Dec. 9 Depression & Suicide
Dec. 10/11 Optional Review Sessions (Contacts TAs)

M Dec 14 Neurodegeneration

TBA Final Examination 12/16

5. Grades

Tests 1-4	45 %	Average of best 3 grades, allow one drop
Final Exam	25 %	
Laboratory	20 %	
Papers	10 %	

6. Policies

Test (44%) and Final Exam (25%)

- The tests will contain True/False and multiple choice questions covering the **lectures**. Lecture material will include all information on the slides from posted on BlackBoard. All the tests will be individually graded on a curve with the class mean set at 78. **45% of grade**
- You are allowed to miss one test, or drop the lowest grade, without permission of the instructor. If you miss a second test, without permission, it will be graded as a zero. **No make-up tests will be given for the tests.**
- The final exam will be **cumulative** and will cover topics from throughout the course. The same questions used in tests 1-4 will be included in the final. In addition all the new material covered in the last four lectures will be presented as new questions. This grade will not be curved. The final exam will count for 25% of your grade
- A make-up will be given for the final exam only under **exceptional circumstances** that must be discussed with Professor Azmitia **prior to the exam.**

Laboratory Grade (20%)

These grades will be given by your Teaching Assistance. There are 11 laboratory sessions and attendance is required (one excused absence is permitted). If you can not make your assigned section, accommodations will be made for you to attend another section the same week. This must be done prior to your session. If you miss a session due to illness or accident, your TA will assign a make-up time for you to do the work. **Laboratories will be graded as Excellent (20 pts), Good (18), Satisfactory (16 pts) or Poor (5 pts).**

Brain Papers (10 % of Grade)

You are required to hand in two papers for this course which will count for 10% of your grade. The papers are to be 1000 words in length, double space, 12 pt. Arial font with 0.5 margins and submitted on line to your T.A. The first paper is due before Laboratory 4, the week of October 2 2014 and the second before last laboratory on Dec. 4, 2013 **Papers will be judged Excellent (5 pts.), Satisfactory (4 pts) or Poor (2 pts).**

The First paper be divided into four sections..

- I. Introduction dealing with your prior exposure to information about brain structure and function (memory, sleep, drug addiction). Also indicate your level of understanding of brain diseases. Books you have read, formal courses taken, lectures and conversations about the brain.
- II. Discuss specific aspects of the lectures and laboratories you enjoyed and which you found not very relevant. Give reasons for your opinions.
- III. Mention and discuss specific topics you would like to be considered in the remaining part of the lecture course and why.
- IV. Finally, provide some specific feedback. Do you have any suggestions for how the lectures can be improved? In the laboratory sections, are there specific things you would have liked to have done?

For the Final Brain Paper, **pick one specific aspect of the brain** you have studied in this course (e.g. limbic system, serotonin, sleep, memory, addiction, autism), and provide a personal and specific discussion of the topic. Please refer to **specific information garnered in the course** and how this has led to your interest in this area. The paper should make frequent reference to *The Brain: A User's Guide* material and it must be clear to the T.A. reading this paper that the ideas are yours and based on your experience in class/laboratory.

Please list and discuss articles from the WEB, scientific papers, newspaper articles and books that have shaped your thinking. **Make sure all referenced material is in quotes.**

Submitting unedited detailed academic accounts copied verbatim from the WEB or other sources is not allowed and proven cases of plagiarism, no matter how brief, will result in loss of all 10 points.

Final Grade

Letter grades for each student will be based on the cumulative scores from final, test average (3 best of 4), laboratory and brain papers.

A : 100-90

A-: 87-90

B+: 86-83

B: 82-72

B-: 71-69

C+: 68-65

C: 64-54

C-: 53-50

D: <50