Neuroscience

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I am interested in pursuing a career that involves the brain so proposing neuroscience as my major seemed only natural. When I graduate I plan on going into medicine. I want to go into neurology, neurosurgery or psychiatry. I am planning on doing an MD/PhD or a research fellowship. Neuroscience, the science of the brain is a multifaceted major that should be highly rigorous in computational, psychological, chemical and biological coursework. Good research experience is also a crucial component of being a neuroscientist.

I have broken down the requirements for my major into three categories: neuroscience core, math and physics core, and research core. To be a good neuroscientist it is important to know the biology, chemistry and physics of the brain. It is important to know and understand how the brain works on both microscopic and macroscopic levels. A good knowledge of organic chemistry, biochemistry and physiology is key to understand the brain on a microscopic level. To truly understand what is going on a macroscopic level you must understand how the individual neurons and their neurotransmitters are interacting with one another. Whereas chemistry and biology provide a good knowledge on what is going on at a cellular level they often struggle to explain how the neurons work together on a more macroscopic level. How does neural network work and how does it affect behavior? This is a question that can often times only be answered through psychology, the science of mental states and processes.

Brain and Behavior relates the biological and chemical processes of the brain to different psychological behaviors. This class is crucial in understanding the link between the microscopic and macroscopic aspects of neuroscience. Cognitive Neuropsychology also enhances the link between the biology/chemistry of the brain and how those

biological/chemical processes are related too and effect behavior. The other psychology classes that I have proposed such as General Psychology, Abnormal Behavior and Health Psychology do an excellent job of going over the macroscopic levels of the brain and how they affect health and behavior.

To be a good neuroscientist you must be familiar with the techniques at your disposal for expanding our knowledge of how the brain works and functions. Techniques such as EEGs, ERP, TMS, MRI, fMRI all require a strong foundation of math and physics to fully appreciate and understand how they work on the brain. It is also useful to have some understanding of the quantum mechanics behind the neural network and how it is involved in generating thought processes and what we call the "mind". Physical Chemistry and Physics of the Human Body go into great detail on what quantum mechanics is and what role it plays in the formation of the "mind" and other bodily processes.

Lastly I have proposed a research core. This aspect of my major will be imperative for preparing me for the environment and hardships of graduate school. Although one is required to take several classes on the brain in medical school, most of my work as a MD/PhD student will revolve on expanding the knowledge of neuroscience. The research core is crucial for this because it will give me experience in designing effective experiments. It will also teach me how to do literature reviews, which are necessary for starting experiments and expanding the ever-growing body of neuroscience. I have been studying learning and memory processes with Dr. Ray Kesner for the past 3 years and have recently coauthored a paper on the Prefrontal and

hippocampal contributions to encoding and retrieval of spatial memory [1] and will use this paper as my thesis.

Major Emphasis Courses

Code	Course Number	Course Title	Department	Credit Hours
NEUROSCIENCE CORE				
Ip	3400	Abnormal Behavior	Psychology	3
+	3711	Brain and Behavior	Psychology	4
+	3510	Biochemistry I	Biology/Chemistry	3
+	3520	Biochemistry II	Biology/Chemistry	3
+	5320	Biology of Aggression	Biology	2
+	3515	Biochemistry I Lab	Biology/Chemistry	2
Ip	3140	Cognitive Neuropsychology	Psychology	3
+	2020	Principles of Cell Biology	Biology	3
+	1210	Principles of Biology	Biology	4
+	1010	General Psychology	Psychology	4
+	2310	Organic Chemistry I	Chemistry	4
+	2320	Organic Chemistry II	Chemistry	4
+	2315	Organic Chemistry Lab I	Chemistry	1
+	2325	Organic Chemistry Lab II	Chemistry	1
+	5710	Advanced Organic Chemistry	Chemistry	2
+	4803	Research Experience /Neuroscience	Psychology	2
+	2420	Human Physiology	Biology	4
+	2030	Genetics	Biology	3
+	1210	General Chemistry I	Chemistry	4
+	1220	General Chemistry II	Chemistry	4
+	3460	Health Psychology	Psychology	3
+	3320	Comparative Physiology	Biology	3
MATH AND PHYSICS CORE				
+	1210	Calculus I	Math	4
+	1220	Calculus II	Math	4
+	2210	Calculus III	Math	3
+	3060	Physical Chemistry I	Chemistry	4

+	2210	Physics for Scientists and Engineers I	Physics	4
+	2120	Physics with Calculus II	Physics	4
+	3110	Physics of the Human Body I	Physics	4
RESEARCH CORE				
+	3010	Research Methods Psychology 3010	Psychology	4
+	3000	Statistical Methods Psychology	Psychology	4
+	3000	Quantitative Analysis	Chemistry	4
Ip	4950	Independent Research: Neuroscience	Psychology	15
+	4955	Individual Research	Biology	3

Remaining Generals

Code	Course Number	Course Title	Department	Credit Hours
Generals				
+	1740	U.S. Economic History	Economics	3
+	1033	Acting I	Theatre	3
		Fine Arts Elective		3
Ip	2010	Intermediate Writing	Writing	3
+	3600	Cross Cultural Communication	Linguistics	3
		Humanities Elective		3

Total Major Emphasis Credit Hours: 123
Total 4000+ Hours: 22

Total Hours Counting Towards Graduation: 141
Total Upper-Division Hours: 71
Hours until Graduation: ~30(20 ip and 10-20 next semester)

Hours by College:

Science: 81
Social and Behavioral Science: 45
Humanities: 15