

## **BMED/BIOL 4752 Introductory Neuroscience (Elective)**

**Catalog Description:** BMED 4752 Intro Neuroscience (3-0-3)  
Prerequisite(s): BMED 3600 or BIOL 3450  
Goals are to understand the components of the nervous system and their functional interactions, and appreciate the complexity of higher order brain functions and pathways.

**Textbook:** Neuroscience, 5<sup>th</sup> edition, Purves et al, Sinauer Associates (2012)  
Brain Rules, Medina, Pear Press (2008)  
The Brain that Changes Itself, Doidge, Penguin Books (2007)

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### **Topics Covered:**

1. Neuroanatomy, development and wiring of the nervous system
2. Membrane physiology, synaptic transmission, neurotransmitters and signaling
3. Somatic sensory system, vision, auditory and vestibular systems, chemical senses
4. Enteric and autonomic nervous system, motor system and active sensing
5. Synaptic and activity-mediated plasticity
6. Association cortices and cortical localization of function
7. Learning and memory, language and speech
8. Drug abuse
9. Functional brain imaging
10. Consciousness, sleep and dreams, emotions
11. Neuroethics

### **Course outcomes:**

Students who complete this course will be able to:

Outcome 1: Understand the building blocks of the nervous system and how they functionally interact (Student Outcome a).

Outcome 2: Appreciate the complexity of higher order brain functions and begin to understand the pathways involved (Student Outcome a).

Outcome 3: Synthesize new connections, ideas and approaches about neuroscience research, drawing from examples given in lecture, handouts and the textbook (Student Outcomes i and j)

Outcome 4: Independently obtain and report, in written and oral form, topical neuroscience information. (Student Outcome g).

Outcome 5: Create lasting, reliable neuroscience contributions to Wikipedia and other online public repositories. (Student Outcomes g, i, and j).

Outcome 6: Appreciate and debate ethical issues surrounding neurobiology (Student Outcomes f and j).

**Correlation between course outcomes and student outcomes:**

<b>BMED 4752</b>											
	Biomedical Engineering Student Outcomes										
Course outcomes	a	b	c	d	e	f	g	h	i	j	k
1	X										
2	X										
3									X	X	
4							X				
5							X		X	X	
6						X				X	

**The Wallace H. Coulter Department of Biomedical Engineering Student Outcomes:**

- a. an ability to apply knowledge of mathematics, science, and engineering;
- b. an ability to design and conduct experiments, as well as to analyze and interpret data;
- c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, societal, political, ethical, health and safety, manufacturability, and sustainability;
- d. an ability to function on multidisciplinary teams;
- e. an ability to identify, formulate, and solve engineering problems;
- f. an understanding of professional and ethical responsibility;
- g. an ability to communicate effectively;
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i. a recognition of the need for, and an ability to engage in lifelong learning;
- j. a knowledge of contemporary issues;
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;