

## Curriculum at a Glance

### **Neuroscience and Biopsychology**

Level: 300

One Semester

Grades 11 and 12

Neuroscience is a field that is devoted to the scientific study of the nervous system. Such studies may include the structure, function, evolutionary history, development, genetics, biochemistry, physiology, pharmacology, and pathology of the nervous system. Neuroscience is at the frontier of investigation of the brain and mind. The study of the brain is becoming the cornerstone in understanding how we perceive and interact with the external world and, in particular, how human experience and human biology influence each other.

<b>Unit Name/Description</b>	<b>Content and/or Skills</b>
Introduction to Neuroscience	<ul style="list-style-type: none"><li>● Anatomy and physiology of neuronal structures</li><li>● Types of neurons in vertebrates and invertebrates</li><li>● Supporting cells/glia cells</li><li>● Action potential and membrane polarity</li><li>● Human reflex arc</li><li>● Voluntary responses vs. reflexes</li></ul>
Structures and Functions of the Nervous System	<ul style="list-style-type: none"><li>● Nativism vs Behaviorism</li><li>● Head trauma and spinal cord injuries</li><li>● Neurotransmitters and the chemical synapse</li><li>● Human body responses to stress/emergency situations</li><li>● Brain imaging technology</li></ul>
Drugs and Behavior	<ul style="list-style-type: none"><li>● Psycho-active drugs and pharmacokinetics throughout the human body</li><li>● Routes of administration</li><li>● Human adolescent behavior and the use of psycho-active drugs</li></ul>

	<ul style="list-style-type: none"> <li>• Sites of action and the reward pathway</li> <li>• Dependency and addiction</li> <li>• Withdrawal and rehabilitation by various cognitive behavioral therapies</li> </ul>
Somatosensory Information	<ul style="list-style-type: none"> <li>• Ear and eye anatomy and physiology</li> <li>• Perception of auditory/visual stimuli as related to temporal and occipital lobe, respectively</li> <li>• Optical illusions and the manipulation of the visual system/nervous system</li> <li>• Compensations for somatosensory deprivations/deficiencies</li> <li>• Technological advances to overcome somatosensory deficiencies</li> </ul>
Sleep and Biorhythms	<ul style="list-style-type: none"> <li>• Circadian and biorhythms</li> <li>• Purpose of sleep</li> <li>• Normal stages of sleep and sleep wave patterns</li> <li>• Alternative states of arousal and brain activity</li> <li>• Sleep disorders and effect on an individual's daily life</li> </ul>
Reproductive Behavior	<ul style="list-style-type: none"> <li>• Genetics, endocrinology, neurology of sexual development in utero and during puberty</li> <li>• Brain regulation of sexual maturation in human males and females</li> <li>• Hypothalamus and pituitary control of menstrual and estrous cycles</li> <li>• Pheromone control over animal behavior</li> <li>• Theories of the origin of sexual orientation</li> </ul>
Final Exam	<ul style="list-style-type: none"> <li>• Review and final exam</li> </ul>