Course Learning Outcomes

Brain Studies

Spring 2024

Description

The following outlines the major learning outcomes for the course. By the end of each unit you should be comfortable and confident with the ideas associated with each.

Unit 1 | The Nervous System, the Brain, and Perception

1. Explain how the form and function of the neuron makes it the dynamic (changeable) element of the nervous system, and explain how sensory and motor information is moved throughout the body.
2. Identify the divisions and various roles of each part of the human nervous system.
3. Explain how reflexes in the nervous system work and what advantages they provide.
4. Describe how a nervous system signal moves from one cell to another.
5. Identify the major parts of the brain and their function as identified in the reference section of your book. Include the order in which they have evolved.
6. Describe the ways in which the brain is involved in the five senses.
7. Explain how fMRI is used in the study of the brain.
8. Explain the ways that drugs affect the nervous system and describe some general types of nervous system disorders.
9. Explain the roles of hormones in the human body.

10. Define **perception** and explain how perceptions are formed throughout our life. Include examples to support the idea that perceptions of our environment are based on prior experiences and learning. Use a variety of experiments as well as illusions to support your answer.
11. What are **illusions**? Describe the four major categories for why they occur. Be specific and use examples from class in your discussion.
12. Give evidence to support that there are more than 5 senses and that the senses are interconnected. Include the concept of **sensory sub-modalities** in your answer.
13. Describe how being an optimistic, positive, and altruistic person provides physical, mental and social benefits to your life and human potential.
14. Explain the role **locus of control** has on perception including attitude. Explain how locus of control may change with age.
15. Explain how stereotyping can alter our perceptions of people and provide clinical (scientific) evidence of the self-fulfilling effect of stereotyping.

Unit 2 | Stress and Wellness Management

1. Define **stress** and provide examples of age related stressors and stress symptoms.
2. Explain the stress response to perceived threats and outline the fast and slow response that occurs during the flight/fight stress response.
3. How does the triplex/triune brain theory relate to stress and explain the models for stress related emotions including downshifting and the reflexive/reflective actions.
4. Explain how stress affects learning and why some stress can be good.
5. Explain Herbert Benson's relaxation response and its applications to benefit a person's wellbeing. Include a description of three different meditation relaxation techniques that can be used to achieve the relaxation response.
6. Explain specifically what bio/neurofeedback is and how it is believed to work. Discuss how strong the evidence is for neurofeedback.
7. Describe the divisions of the human nervous system and their roles in stress management. Explain how a person can use a variety of methods to tap into the autonomic nervous system.
8. Explain how diet, exercise, and natural highs can be used to manage stress levels and include the benefits they provide over using self-medication techniques of drugs and alcohol.
9. Describe the various types of meditation and reflect upon their effectiveness for your personally.
10. Describe and explain what happens during sleep.
11. Explain the reasons for sleep, exercise, and nutrition on both the brain and body and why we should incorporate all three of them into our wellness plan.
12. Explain how the human immune system is linked to the nervous system and the role stress and wellness management can play with regard to overall physical and mental health.
13. Explain what is meant by the two evolutions of the mind and provide examples of how stress in our environment affects the second evolution with regards to neurogenesis.

Unit 3 | Models of Intelligence and Brain Development

1. Define intelligence and provide a working model for how the brain acquires intelligence throughout its second evolution. Include the concept of brain plasticity in your discussion.
2. How would you raise your child to maximize brain development based on recent studies in child development and brain research?
3. Define the concepts of I.Q., E.I., and multiple intelligences (M.I.). Discuss how valid and reliable the tests are in their measurements.
4. Name and describe the seven major multiple intelligences described by Howard Gardner. In what ways do I.Q. tests fail in evaluating the multiple intelligences?
5. How can visualization affect the body and mind? (use the washer activity, music, spatial test and other class experiences to support your answer.) Where does visualization occur in the brain?
6. How is the teen brain different from an adult brain and how are these differences expressed in teen behavior? Include the evolutionary reasons for the teen brain's development.
7. What is the corpus callosum? How do bilateral manipulation, hemispherectomies, and split-brain patients reveal its role in brain function?
8. Contrast the major differences in the functions of the left and right hemispheres. Include an argument for why we cannot be considered either "right brained" or "left brained" in terms of our behavior.
9. Describe the differences between a left, right and whole brained method for learning any skill or concept. Explain how you-would best learn a task or subject based on your preferred learning style.
10. What is a lobotomy and who and why is Phineas Gage important to brain studies? Include the role of the prefrontal cortex in your discussion.

Unit 4 | Memory and Performance

1. What is the difference between the concepts of memory and recall?
2. How can memory techniques such as *chunking*, *the peg method*, *the link method*, *the loci method* and *the substitution method* aid in helping recall? Explain under which conditions you would use each.
3. Explain how we form memories. What is the role of the hippocampus in memory formation? What is the evidence for this? Where are short and long-term memories stored in the brain?
4. Describe and explain the significance of the limited capacity of working memory on our ability to learn and understand.
5. What are the primacy and recency effects and why is breaking the learning session into smaller sections helpful for recall?
6. What role does visualization and rehearsal/repetition play in aiding memory formation and recall?
7. Why do study groups aid in both recall and performance?
8. How is learning a new skill such as juggling or sport cup stacking related to memory? What type of memory is this and where are these types of memories stored?