Advanced Physiological Psychology

Psychology 473, Spring 2003, T/Th 10:35am – 11:50am

Instructor: Bill Griesar, Ph.D. (bgriesar@pacifier.com)

Office hours: Tuesdays before class, and on review days (and any time by e-mail)

Book: *Phantoms in the Brain,* by V.S. Ramachandran

Objectives: The primary objectives of this course are to:

(1) Teach you to gather, evaluate and present scientific information; and

(2) Provide you with a better understanding of the nervous system through discussion and presentation of current topics in neuroscience research.

We will concentrate on three topics: **Memory**, **Drugs**, and **Emotion**. I will provide one review article or book chapter for each topic, and **you will find one additional article about each topic for group discussion in class**. Your articles can come from scientific journals, magazines, book chapters, or the internet.

You will also learn more about the nervous system by **writing a research paper** on a neurological disorder of your choice, **presenting a poster** reflecting your research on this disorder, and by **reading and discussing the book by V.S. Ramachandran**.

Grades: Grades will be based on a 90% = A, 80% = B, 70% = C, and 60% = D scale. Course points (which will total 100) are accumulated in the following ways:

1. ***Basic brain review exam*** *(10):* From material covered in lectures.
2. ***Ramachandran questions and participation*** *(5):* You should e-mail *at least one* question about the book chapters to be discussed 24 hours before class. You will receive points for these question(s) and for class participation each day.
3. ***Ramachandran presentations*** *(10):* Students will form six groups, and each group will orally present a series of chapters from the book (10 points per student).

4. ***Ramachandran exam*** *(10):* From material covered in the V.S. Ramachandran book.
5. ***Article summaries*** *(15):* For each of the three topics, you will write a summary of an article you select (3 x 5 points). A copy of the article must be submitted with your summary. Your summary must do *four* things: (a) state the **objective** of the article (i.e., Why did the author(s) write the article? What questions were they trying to answer?); (b) describe the **techniques** that were used; (c) summarize the **main points** or findings; and (d) **evaluate/critique** the article. You should e-mail the title of the article 24 hours before the article summary is due.
6. ***Memory exam*** *(10):* From material covered in lectures and discussion.
7. ***Drug exam*** *(10):* From material covered in lectures and discussion.
8. ***Emotion exam*** *(10):* From material covered in lectures and discussion.
9. ***Research Paper*** *(20):* You will write a research paper on a nervous system disorder of your choice (10). As preparation for writing a good paper, you will: (a) submit research articles on your topic (2); (b) submit an outline, or summarize how you will organize your paper (3); and (c) present a poster on your topic (5).

ASSIGNMENT	**POINTS**	**DUE DATE(S)**
Basic brain review exam	10	February 4
Rama. questions/participation	5	February 6 - 27
Rama. chapter presentation	10	February 6 - 25
Ramachandran exam	10	March 4
Article summaries (3)	15	March 11, April 1, April 17
Memory exam	10	March 27
Drugs exam	10	April 10
Emotion exam	10	April 29
Research paper*	20	Due: May 1

*Submit article(s) for paper	(2)	February 27
*Submit paper outline	(3)	April 1
*Poster presentation	(5)	May 1
*Research paper	(10)	May 1
TOTAL POINTS	**100**	

CLASSES:

Basic brain review

1. **Introduction** (1/14): introductions, course information, syllabus, how to use Medline and other on-line databases, library resources at WSU and elsewhere
2. **The Neuron** (1/16): neuronal (and glial) structure/function, electrical properties of neurons, resting potential and action potentials, role of myelin
3. **The Synapse** (1/21): chemical transmission, neurotransmitters, network architecture, video segment (excerpt from "Fast, Cheap and Out of Control")
4. **Gross Anatomy** (1/23): anatomical terminology, basic structures, cortex versus nuclei, central role of the thalamus, brainstem
5. **The Cortex** (1/28): basic structure and function (lobes, sulci, gyri), sensory vs. association, Brodmann areas, motor/somatosensory gyri, language areas, etc.
   - *READ "The columnar organization of the neocortex," by V. B. Mountcastle*
6. **Review and brain dissection video** (1/30)
7. **Basic brain review EXAM** (2/4)

Phantoms in the Brain, by V.S. Ramachandran

Students divided into six groups: Each group presents one set of chapters…

(Use overheads, handouts, and draw on related research articles from PubMed…)

8. **Chapters 1, 2** (2/6): student presentations and discussion
9. **Chapters 3, 4** (2/11): student presentations and discussion
10. **Chapters 5, 6** (2/13): student presentations and discussion
11. **Chapters 7, 8** (2/18): student presentations and discussion
12. **Chapters 9, 10** (2/20): student presentations and discussion
13. **Chapters 11, 12** (2/25): student presentations and discussion
14. **Ramachandran discussion and review** (2/27)
15. **Ramachandran EXAM** (3/4)

Memory

16. **Memory** (3/6): memory is inherent in the structure of neural networks, Hebb and cell assemblies, the hippocampus, long term potentiation (LTP), does LTP underlie memory?, what causes LTP?, behavioral LTP, a smarter mouse?
17. **Memory** (3/11): H.M. and selective memory deficits, mirror drawing and priming, declarative versus procedural memory, animal models of amnesia, DNMS, Morris water maze, radial arm maze, relational memory theory.
18. **Memory** (3/13): latest research articles and discussion
19. **Memory** (3/25): latest research articles and discussion
20. **Memory EXAM** (3/27)

Drugs

21. **Drugs** (4/1): drugs interfere with synaptic transmission, abuse, dopamine pathways, mechanisms of action, tolerance, dependence, withdrawal, treatments
22. **Drugs** (4/3): latest research articles and discussion

23. **Drugs** (4/8): latest research articles and discussion
24. **Drugs EXAM** (4/10)

Emotion

25. **Emotion** (4/15): what are emotions?, history of emotion research, stability of expressions, voluntary versus spontaneous expression, hypothalamus and homeostasis, emotions and "rational" decision-making
26. **Emotion** (4/17): Papez circuit (rationale and anatomy), Kluver-Bucy syndrome, limbic system, amygdala, medial forebrain bundle, the hippocampus (emotions and memory)
27. **Emotion** (4/22): latest research articles and discussion
28. **Emotion** (4/24): latest research articles and discussion
29. **Emotion EXAM** (4/29)
30. **Research POSTER SESSION** (5/1): student poster presentations