MAMMALIAN NEUROBIOLOGY: 2006

PSYC 531 Mammalian Neurobiology (3:2:3)
BIOL 516 Mammalian Neurobiology (3:2:3)
NEUR 603 Mammalian Neurobiology (3:2:3)
T 9:30 – 11:20, KB 229 and R 9:00 – 11:40, DK 3044
Last day to add class: Feb 7th / Last day to drop class: Feb 27th

Prerequisite: PSYC 527 / 461 or BIOL 515 (Introduction to Neurobiology) or NEUR 601 (Developmental Neurobiology).

Instructor: **Dr. Butler**
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Mail Stop: 2A1 **Email: ABButler@gmu.edu**
Office Hours: T 11:30 – 12:30 or (recommended) by appointment

Texts (Required): Haines, D.E., *Fundamental Neuroscience*, 3rd Edition, 2005, Churchill Livingstone, New York.
DeArmond, S.J., Fusco, M.M., and Dewey, M.M., *Structure of the Human Brain: A Photographic Atlas*, 3rd Edition, 1989, Oxford University Press, New York.

Prerequisite: Introduction to Neurobiology, taught each fall semester, is a prerequisite for Mammalian Neurobiology. Mammalian Neurobiology may be audited with permission of the instructor, but no student who has not successfully completed Introduction to Neurobiology may take Mammalian Neurobiology for academic credit.

Lab Supplies: Sheep brains – Carolina Biological BA-22-8711, with dura mater intact, singly packed: these will be supplied in the laboratory.

Goals and Requirements: The goals of this course are to achieve a specific knowledge base in mammalian neurobiology and to achieve a detailed understanding of the functional anatomy of mammalian brains. Examples from human clinical material are used where possible to illuminate anatomical relationships. The requirements are to learn the material presented in lecture and laboratory, as augmented and assisted by attending the lectures and the laboratories and by reading the relevant portions of the text and atlas.

Nature of Course Content: See the list of lectures and laboratories below.

Method of Instruction: The lecture part of the course consists of a series of didactic lectures. The laboratory part of the course includes sheep brain dissections, examination of microslides of monkey brain sections and other related histological materials, examination of embedded slices of human brain material, and study of human brain sections as provided in the laboratory atlas and with projected 35 mm slides. A series of videotapes demonstrates aspects of human brain dissection. Various human neurological case histories are analyzed in order to integrate anatomical relationships.

Attendance: Lecture attendance is very important since the material presented will cover both the required readings and additional material presented in lecture. The lectures constitute the core material of the course. Laboratory attendance is also very important since materials are unique and cannot be duplicated outside of the lab.

Assignments: There are no specific assignments of work outside the class. It is expected that you will read your textbook and use your atlas in addition to studying the lecture notes in order to learn the material discussed in class.

Method of Evaluation – Exams: Two interim exams on the lecture material will be given during the course of the semester, and the final exam will be comprehensive. Exams will consist of questions in the form of multiple choice, fill in a blank or short list, fill in a label on a figure, or written answers of short to moderate length. Laboratory exam questions will involve identification of structures from material studied in the laboratory. An interim laboratory exam will be given, and a final laboratory exam will be given during the last scheduled laboratory period.

The average score for the two lecture exams will be weighted as 33% of the final grade; the final exam on the lecture material will be weighted as 34% of the final grade; and the average of the two lab exams will be weighted as 33% of the final grade. The instructor reserves the option of weighting the final lecture and/or lab exams to a greater percentage if marked improvement over the interim exam scores has occurred. A course score of 90 or above generally results in a grade of A- or above, 80 or above in B- or above, and 70 or above in C- or above. The numerical score is only a guideline, however, and is not absolute. The final grades may be determined on a curve if this is to the students' favor and justified in the opinion of the instructor.

Policy regarding missed exams: Unless the student has the previously obtained consent of the instructor for postponing an exam or has written medical documentation for absence from an exam, the instructor has the option to impose a grade-loss penalty of 10% that will be deducted from the score for the make-up exam. Permission to postpone an exam will only be granted for important and acute reasons and then only for a few days, since such arrangements are potentially unfair to the other students in the class. Examples of valid reasons, with prior (or same day) permission, include illness, needing to take one's pet to the veterinarian, or the chance to take a trip to Paris. No more than one trip to Paris should be invoked per semester, however. The make-up exam will either be structured like the original exam or will be a combination of short-answer, essay, and/or oral questions. The type of make-up exam will be chosen by the instructor based on what is most convenient for her.

Honor Code, Incompletes, and Disability Accomodation: University policy on the honor code and incompletes applies to the lecture and laboratory parts of this course. When taking exams, no books, notes, or student interaction is allowed. If you are a student with a disability and you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through that office.

MAMMALIAN NEUROBIOLOGY LECTURES

[Reading the corresponding chapters in Haines is highly recommended but not required.]

Week 1	1. Skull, Meninges, and Sinuses 2. Ventricles and Vasculature
Week 2	3. Spinal Cord I 4. Spinal Cord II
Week 3	5. Peripheral Cranial Nerves 6. Hindbrain I: Medulla Oblongata and Medullary Cranial Nerve Nuclei
Week 4	7. Hindbrain II: Pons, Cerebellum, and Pontine Cranial Nerve Nuclei 8. Midbrain and Cranial Nerve Nuclei
Week 5	9. Diencephalon: Epithalamus, Hypothalamus (brief) and D. Thalamus 10. Overview of Forebrain and Midbrain-Basal Ganglia Connections
Week 6	**EXAM on Lectures 1 - 9** 11. Ventral Thalamus and Basal Telencephalon
Week 7	12. Cerebral Cortex 13. Review of Visual System
	Spring Break
Week 8	14. Somatosensory System 15. Auditory System
Week 9	16. Vestibular System 17. Olfactory and Gustatory Systems
Week 10	**EXAM on Lectures 10 - 17** 18. Comparative Aspects of Sensory Systems in Mammals
Week 11	19. Motor Systems I: Brainstem and Spinal Pathways 20. Motor Systems II: Corticofugal Pathways
Week 12	21. Motor Systems III: Basal Ganglia 22. Motor Systems IV: Cerebellum
Week 13	23. Hypothalamus and Autonomic Nervous System 24. Limbic System
Week 14	25. Higher Cortical Functions: Frontal & Parietal Lobes; Lateralization 26. Review: Analysis of a Minute of a Life
Exam Week	**FINAL LECTURE EXAM: May 16 at 7:30 am to 10:15 am (officially designated schedule) or (at student's option) May 9 at 9:30 am – 11:20 am (or until as long as student wishes)**

MAMMALIAN NEUROBIOLOGY LABS

1. Introduction; Meninges, Vasculature, and Ventricular System
2. Histology and Gross Anatomy of Sheep Brain: Transverse and Mid-sagittal Sections
3. Spinal Cord and Brainstem
4. Pons, Cerebellum, and Midbrain
5. Forebrain I
6. Forebrain II
7. Review and Assemble Brain Model

SPRING BREAK

8. Revival and Review for Exam
9. **EXAM**
10. Higher Functions I
11. Higher Functions II and Olfactory System
12. Higher Functions III and Motor Systems plus Review for Final Lab Exam
13. Higher Functions IV and Limbic System plus Review for Final Lab Exam
14. **FINAL LAB EXAM: May 4, 10:00 – 11:00 am**