

Neuroanatomy: The Human Brain

(NSC 274, formerly Psy 274)

Fall 2010

This is an intensive course on the structure and function of the human nervous system aimed at graduate students and advanced undergraduates. This course will equip the neuroscience student with a firm foundation in the anatomical aspects of the vertebrate central nervous system and is essential for any serious student in the neurosciences. The emphasis will be on understanding functional systems—sensory, motor, cognitive, and emotional—in an anatomical framework. Some comparative neuroanatomy will also be incorporated with the aim of preparing students for animal studies.

Neuroanatomy is a demanding course due to the large volume of material and new vocabulary. Mastery of concepts will require understanding of complex anatomical relationships between the multiple functional systems in the brain. It is imperative that the student stay on top of material on a daily basis. The student that falls behind rarely is able to catch up in an adequate fashion. Since vocabulary and concepts are cumulative, missing one class will impair the ability to absorb information in the next class.

Laboratory: One of the greatest challenges to understanding the brain is its three-dimensionality. To help the student master these geometrical relationships, there will be several laboratories in which understanding will come through hands on dissection of brain material and learning to recognize structural relationships seen from different orientations. Instructive brain models will be available. Bring brain atlas on lab days.

Instructor: Anna Roe, Professor of Psychology

Books:

Workbook: Sidman and Sidman, 1965. *Neuroanatomy: A Programmed Text/ Volume 1*. Little, Brown and Company. This book is a self-paced instructional book that gives a good overall 3D understanding of the brain. The approach of the Sidman & Sidman book is different from most textbooks in that you "do" it rather than "read" it. **This workbook MUST be completed before or during the first week of class.** It will make the class experience easier if you do this workbook first. A new version of this has just been released. I have ordered it and hopefully it will be in the bookstore soon. The old version, which can be obtained very cheaply (e.g. on Amazon), is fine for purposes of introducing you to neuroanatomy and terminology. However, be aware that there are few (pretty obvious) mistakes in the old version.

Main text & atlas: Haines. *Fundamental Neuroscience for Basic and Clinical Applications* (third edition). This is a systematically presented introductory text with informative, diagrams. This textbook contains more information than you will be asked to know. Use it as a study tool (esp diagrams), reference and guide. Accompanying atlas is a must.

Also Recommended:

DeArmond SJ. Structure of the Human Brain: a Photographic Atlas. This atlas has more detail and more sections than the Haines atlas. This is the best to study from. However, it does not have nice diagrams like Haines.

Netter, 1983. The CIBA Collection of Medical Illustrations. Nervous System, Part 1: Anatomy and Physiology. Gorgeous hand-drawn illustrations.

Kandel, Schwartz and Jessel. *Principles of Neural Science* (Fourth Edition). This is a highly instructive general neuroscience text.

Carpenter, 1978. Core Text of Neuroanatomy, 2nd edition. The bible.

Digital Anatomist Interactive Atlases (<http://www9.biostr.washington.edu/da.html>). Useful for testing yourself.

Course requirements and grading:

Grades will be based on labs & homeworks (10%), quizzes (50%), mid-term (20%), and final exam (20%).

Fall Lecture Schedule

Brain

Parts

26-Aug Overview/Development

31-Aug Gross Anatomy

Spinal Cord Tracts: Inputs & Outputs of the Brain

2-Sep How do we move our limbs?

Lab 1: Gross anatomy, comparative neuroanatomy

7-Sep

Quiz 1/ How do we feel touch, proprioception?

9-Sep

14-Sep How do we respond to stepping on a tack?

Brainstem & Cranial Nerves

16-Sep Brainstem External/*Lab2: Brainstem*

21-Sep How do we move shoulders, tongue, eyes?

23-Sep **Quiz2**

How do we feel touch on the face? How do we smile?

28-Sep

30-Sep Blood supply/How do we see & hear?

5-Oct How do we smell & taste?

7-Oct **Quiz3**/How do we control viscera?

12-Oct How do we stay awake?

14-Oct **Fall Break**

19-Oct *Lab3: Seeing/drawing brainstem, neurol exam*

21-Oct **Midterm**

Hypothalamus, Amygdala & Hippocampus

26-Oct How do we regulate warmth, hunger, sex

28-Oct How do we feel emotions? remember things?

2-Nov *Lab4: Drawing the fear response*

4-Nov Thalamus & cortex

9-Nov How do we perform automatic actions?

11-Nov Joe Neimat, neurosurgery

16-Nov Pete Konrad, *Motor Dysfunction*

18-Nov **Quiz4**/How do we learn & modify behavior?

23-Nov **Thanksgiving**

Cerebral Cortex: Higher Order Behavior

25-Nov **Thanksgiving**

30-Nov The computational brain

2-Dec Visual behavior: perception, attention, action
Quiz5//How do we think? Imagine? Dream?

7-Dec Believe?

9-Dec Evolution & Wrap-up

11-Dec **FINAL EXAM 9am**