Introduction to the Neuroscience of Human Communication

Department of Speech-Language-Hearing Sciences
Fall Semester, 2013 (09/03/2013 – 12/19/2013)

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Lectures: 1:00PM- 2:15PM TTh, Shevlin Hall 20

Course Description

This course is intended to provide students with an overview of neuroanatomy, neurophysiology, and neuroscience pertinent to processes of human communication behavior and disorders of communication. Although it is intended for students who are majoring in Speech-Language-Hearing Sciences, students with some science background are welcome. Emphasis is on structural and functional relationships necessary for speech, language, hearing, and cognition although a general knowledge of the nervous system is first required. Topics include: gross anatomy of central and peripheral nervous systems; sensory systems, especially special systems (vision, auditory, gustatory), motor systems, and functional hemisphere and cortical organization. Neuropathology of stroke, progressive diseases, traumatic brain injury and other neurological disorders that result in cognitive or communication disorders are emphasized throughout the course, after an introduction to current diagnostic techniques.

Course Objectives and Standards

At the conclusion of this course you will be able to

1. Demonstrate knowledge of basic neuroanatomy and neurophysiology mechanisms instrumental to normal speech, language, cognition, and hearing
2. Explain blood supply to the CNS and describe protective mechanisms to the brain
3. Demonstrate understanding of basic brain/behavior correlates; describe functional organization of brain activity during activities such as repeating words, reading words, gesturing, listening and following simply auditory commands, writing a sentence, etc.
4. Explain the neurological basis for common pathologies in neurogenic communication disorders across the life-span.

ASHA Standards that pertain to SLHS 4301

- **Standard IV-B.** The applicant must have demonstrated knowledge of basic human communication and swallowing processes, including the appropriate biological, neurological, acoustic, psychological, developmental, and linguistic and cultural bases. The applicant must have demonstrated the ability to integrate information pertaining to normal and abnormal human development across the life span.

- **Standard IV-F:** The applicant must have demonstrated knowledge of processes used in research and of the integration of research principles into evidence-based clinical practice.

Accommodations for students with disabilities

It is University of Minnesota policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Please contact me if you would like to discuss your individual needs for accommodations.

Student Responsibilities

Required Textbooks

- Bhatnagar, S. (2012). Neuroscience for the Study of Communicative Disorders, 4rd Edition Revised. Lippincott Williams & Wilkins.

- There will occasionally be additional readings throughout the semester. We will alert you to these and provide them on Moodle for you to read and/or download.

Optional Textbooks (available at most at many bookstores or on-line):

- Nolte, J., & Angevine, J. B. (2013). The Human Brain in Photographs and Diagrams (4th Edition), St. Louis, MO: Mosby.
- Wilson-Pauwels, L., Akesson, E.J., Stewart, P. A. and Spacey, S. D. (2002). Cranial Nerves in Health and Disease, 2nd Edition. Earlier versions are appropriate as well.
- Human Brain Coloring Books are readily available from the UMN bookstore and other sources.

Exams (60% of final grade)

Three examinations will be given during the course of the semester. Each Exam is worth 20% your final course grade. Exam 3 is on the last day of class. The format will include T/F, fill-in, multiple choice, and short answers. Each exam covers designated material from labs, lectures, discussions and readings. Review sheets are provided before each exam. Review sessions will be held prior to each exam. Make-up exams are allowed if you are ill, notify the professor prior to the exam and bring a physician's or clinic note to class when you return. If this occurs, the make-up exam must be taken within 1 week.

Weekly quizzes (20% of final grade)

Starting **Tuesday, 9/10**, there will be weekly quizzes that cover the material from the previous week and are worth 10 points each. Quizzes may include T/F, multiple choice, and fill-in-the-blank question formats and take no more than 10 minutes to complete at the beginning of each Tuesday's class. There are no quizzes on the week or day of an exam.

Here is how your overall quiz grades are created:

- I automatically drop your lowest quiz grade at the end of the semester. The exception to this is the cranial nerve quiz, which is mandatory.
- The average of the quizzes will be calculated and this average grade is worth 20% of your final grade.
- THERE ARE NO MAKE-UP QUIZZES. IF YOU MISS A QUIZ, YOU CAN CONSIDER THAT SCORE OF "0" THE ONE THAT I WILL DROP. IF YOU ARE ILL, PLEASE BRING A NOTE FROM YOUR CLINIC OR MD INDICATING SO, AND YOU CAN MAKE UP THE QUIZ. THIS NEEDS TO BE DONE WITHIN A WEEK OF THE QUIZ.

Laboratory Experience (8% if final grade)

There is one in-class/take home laboratory assignment that includes use of a DVD (NeuroTime) in Shevlin Hall, your textbooks and models of the brain. Instructions and lab sheets will be provided for you. This lab is worth 8% of your final grade.

Final Project Presentation (12% of final grade)

In groups of three, you will "research" a neurological disorder and give a short, 10 min presentation to the class, on **Tuesday, Dec 17, 8:00 AM to 10:00 PM,** the scheduled day/time for the final "exam". We will provide you with a list of disorders you can choose from later in the semester. You will be required to turn in a written version of the presentation as well. The written format will be made available to anyone who wants it through Moodle. This project is worth 12% of your final grade. Project information should include the following (more details will be provided later):

- ☑ Incidence and/or prevalence of the disorder
- ☑ Review the neurological bases of the disorder
- ☑ Review the phenotype of the disorder, including any speech, language, cognitive, hearing or balance problems.
- ☑ Describe therapy that is available (surgery, pharmacological, behavioral, etc).
- ☑ Include a list of references where you got your information.
- ☑ Provide web-based resources for those interested in learning more.

Grading Summary

The final grade is determined in the following manner:
Quizzes=20%; Exams=60%; Lab = 8%; Final presentation = 12%.

Grade scale is as follows: A = 94 – 100; A-= 90 – 93; B+ = 87 – 89; B = 84 – 86; B- = 80 - 83; C+ = 77 – 79; C = 74 – 76; C- = 70 – 73; D+ = 66 – 69; D = 63 – 65; F = 62 or below.

UMN Definition of Grades and Workload

A – achievement that is outstanding relative to the level necessary to meet course requirements
B – achievement that is significantly above the level necessary to meet course requirements
C - achievement that meets the course requirements in every respect
D – achievement that is worthy of credit even though it fails to meet fully the course requirements
S – achievement that is satisfactory, which is equivalent to a C- or better
F (or N) – represents failure (no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that student would be awarded an I (see also I). Academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course.
I (Incomplete) – assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing work of the course on time. These require a written agreement between the instructor and student.

For each semester credit the average workload expectation is 1 hour of class and 3 additional hours of preparation per week. Therefore, a 3-credit course will involve approximately 9 hours of outside class preparation on your part and just under 3 hours of in-class time. Please familiarize yourself with:
UMN's policy on Student Conduct
(http://www1.umn.edu/regents/policies/academic/StudentConduct.Html)
Academic Misconduct:
(http://www1.umn.edu/regents/policies/humanresources/AcademicMisconduct.Html)

Weekly Topics (Tentative Schedule)

Quizzes are given every Tuesday of the weeks marked with "*"

Week	Topic	Reading/Materials
1 - 9/3 & 5	Studying the Brain & Nervous system Planes & sections	Ch 1
*2 - 9/10 & 12	Neurons, Glial cells Propagation of impulses & synapses Gross Neuroanatomy	Ch 5 Ch 2
*3 - 9/17 & 19	9/17, Quiz; Gross Neuroanatomy; Meninges & Ventricles	 Ch 2
*4 - 9/24 & 26	**9/26 - In class lab**	Ch 2; Ch 8
*5 - 10/1 & 3	Diagnostic & imaging techniques Blood supply to the brain & brainstem	Murray & Clark (Moodle); Ch 20 Ch 7
6 - 10/8 & 10	**10/8 Exam #1** Strokes	Murray & Clark (Moodle) Ch 7
*7 - 10/15 & 17	Special systems: Vision Special systems: Hearing, Balance & lesion effects	Ch12 Ch 9 & 10
*8 - 10/22 & 24	Special systems: Hearing, Balance & lesion effects [Special systems: Taste]	Ch 9 & 10; Nolte (Moodle); Ch 17
*9 – 10/29 & 10/31	10/29 - Meet/work in groups of 3 on projects Upper & lower motor lesion effects; CN I, III, IV, V & lesion effects	CN images from Wilson-Pawles et al. (Moodle)
10 - 11/5 & 7	**11/5 - Exam #2** 11/7 - Cranial nerves VII, IX, X, XI, XII & lesion effects	CN images from Wilson-Pawles et al. (Moodle) Ch 17
*11 -11/12 & 14	**11/12 - Mandatory cranial nerve quiz** Functional organization of cortex: Sensory & motor control	Murray & Clark (Moodle) ; Ch 11, 16
*12 – 11/19	Functional organization of cortex: Language, Memory & Cognition	Ch 19
*13 - 11/26 & 28	Functional organization of cortex: Language, Memory & Cognition Traumatic Brain Injury	Selections posted on Moodle Ch 19
*14 - 12/3 & 5	12/3 - Traumatic Brain Injury (continued) **12/5 Final presentations**	Selections posted on Moodle Ch 19
15 - 12/10	last day of class **Exam #3**	
12/17	**Final presentations** – groups in rooms 20 and110	8:00 - 10:00 a.m.

Note: This tentative schedule is subject to change depending on actual progress. See updates in the News section on the Moodle course web site for SLHS 4301 at http://myu.umn.edu