SYLLABUS

Cognitive Neuroscience (PSYDBS 620)

Brief course description:
This core course covers the cognitive and neural processes that underlie perception, attention, memory, language, social cognition, decision-making and executive function. Classic and recent journal articles will be discussed both to extract major findings and to elucidate the various methods - neuropsychological evaluation, psychophysical measurement, single-cell neurophysiological recording, neuroimaging - that allow for inferences about the brain bases of cognition.

Required readings:

- A selected reading list of 10-13 recent journal articles (see below).

Requirements:

1. Two paper presentations (20% of the final grade each):

Based on the selected paper and some background research (min. 5 related papers), please prepare an approx. 20-25-minute-long PowerPoint presentation. Feedback on your presentation will be provided on a rating sheet.

2. Comments (20%):

After reading the assigned papers, please formulate one comment for each paper in writing. The comment can be a discussion question or a genuine comment. We will use these comments during the paper discussions. Please post your comment on the class blog no later than two hours before the beginning of each class. You can skip commenting on one of the 10 assigned papers throughout the course of the semester and you don't need to post comments on the week when you are presenting.

3. Final paper (20%):

Min. 15-page long paper related to one the topics discussed in class (cannot be the one that you presented!). The paper should argue for or against the theory/position. You should use a minimum of 10 references. A draft outline is due two weeks before the paper due date.

4. Two quizzes (10% each):
The first quiz will be on Week 7, the second one on Week 13. Each quiz will consist of ten short answer questions/problems.

Attendance:

Everyone is expected to attend class. You can miss one class during the semester without a penalty. If you miss a second class, your final paper will have to be 5 pages longer, if you miss another one, 10 pages longer. If you miss a class because you are sick, please bring a doctor’s note (and the paper length will not be affected). If you miss more than three classes for whatever reason, you will need to write a second paper.

Class Schedule:

For each week, the corresponding chapter of the Gazzaniga-Ivry-Mangun textbook is required (Week 01 = Chapter 1, etc).

Week 01: A brief history of cognitive neuroscience (Gall, Flourens, Hughlings Jackson, Broca, Cayal, Penfield; Miller, Chomsky, Neisser)


Week 02: Overview of the nervous system (neurons, cell signaling, gross functional anatomy of the central nervous system)


Week 03: Methods of cognitive neuroscience (neurophysiological and imaging methods, neurological disorders, cognitive psychology and computational modeling)


Week 04: Perceptual systems (visual system organization: magnocellular pathways, ventral/dorsal cortical streams, low-level visual organization, object recognition)

Week 05: Attention (theoretical models of attention, top-down vs. bottom-up processes in orienting, selective and divided attention, cortical control systems)


Week 06: Memory (models of human memory organization, short- and long-term memory, the memory system in the brain, amnesia)


Week 07: Language and the brain (theories of language, the mental lexicon, imaging and ERP studies, aphasia)


Week 08: Cerebral lateralization (principles of cerebral organization, communication between the hemispheres, hemispheric specialization in perception, language)


Week 09: Motor control (the motor system, computational issues in motor control, movement disorders)


Week 10: Executive functions (the subdivisions of the frontal lobes, executive functions: cognitive control, inhibition, planning, social behavior)


Week 11: Development and plasticity (overview of cognitive and emotional development, cortical development, experience-dependent plasticity, cortical reorganization)

Week 12: Evolutionary perspectives (adaptations at multiple levels, sexual selection and evolutionary pressures on behavior, evolutionary insights into human brain organization)


Week 13: The problem of consciousness (philosophical perspectives [Dennett, Searle, Baars], conscious vs. unconscious processing, binocular rivalry, split brain)


ACADEMIC DIFFICULTIES:

The University Advising Center provides for students who are in need of advising and/or tutoring. (Campus Center, 1st floor, Room 1100, http://www.uac.umb.edu/). The University of Massachusetts Boston attempts to accommodate all students in accordance with Section 503 and 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. Through the Ross Center for Disability Services various aids such as sign language interpreting, readers, testing accommodations, etc. are available to students. If you believe that you require such services, you should contact the Ross Center (Campus Center, 2nd Floor, Rm. 2010, 617-287-7430).

STUDENT CONDUCT:

Students are required to adhere to the University Policy on Academic Standards and Cheating, to the University Statement on Plagiarism and the Documentation of Written Work, and to the Code of Student Conduct. The Code is available online at: http://www.umb.edu/student_services/student_rights/code_conduct.html

If you still have questions about Academic Honesty or expectations in this course, please contact the professor.

INCOMPLETE GRADES:

Incomplete grades can only be given if a student is in good standing and is prevented from completing the course by documented circumstances that are beyond his/her control.