NATIONAL
ACADEMY OF
NEUROPSYCHOLOGY

Behavioral & Cognitive Neurology
Course Syllabus

OVERVIEW

The goal of this course is to provide students with an overview of the behavioral geography and large scale networks of the brain and to review the disorders of higher cortical functions and the major neurobehavioral syndromes, including frontal lobe syndromes, hemispheric asymmetries, attention and confusional states, memory and amnesias, aphasia and related disorders, affective prosody and aprosodias, disorders of complex visual processing, and the dementias.

COURSE DIRECTOR

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REQUIRED MATERIALS

Mesulam, M.-M. (2000). *Principles of behavioral and cognitive neurology*, 2nd edition. New York: Oxford University Press (ISBN 10: 01-9513-4753; ISBN 13: 978-0195-1347-59).

Students should purchase the Mesulam text from the vendor of their choice immediately after registration.

There are also required supplemental readings consisting of journal articles for each of the 7 modules. The articles are listed below in each of the modules. The journal articles will be available online in pdf format for students to download.

DURATION, CREDITS, WORKLOAD

This is a 12-week online learning experience that combines textbook and journal article readings, online materials, supplemental discussion questions, and student-instructor interactions via an online discussion board. The course is divided into seven learning modules. Modules 1, 2, 3, and 5 are two-weeks in duration, and Modules 4, 6, and 7 each last one-week. There is an additional week at the end of the course to allow students to complete any outstanding work necessary to obtain the CE credits.

Students who successfully complete all course requirements are eligible to receive 24 CE credits for psychologists. The National Academy of Neuropsychology is approved by the American Psychological

Association to sponsor continuing education for psychologists. The National Academy of Neuropsychology maintains responsibility for this program and its content.

The DistanCE program expects that a MINIMUM workload of 3-4 hours of work is necessary to keep up with the course.

Instructional Level: Intermediate

COURSE FEES

NAN Members: $360
Non-members: $600

OBJECTIVES

Upon completion of the course, the learner will be able to:

1. Describe the major divisions of the cerebral cortex and understand the functions of the individual cortical zones, the modality-specific (unimodal) association areas for vision, audition, somatosensory functions, and motor functions, temporal heteromodal cortex and the agnosias, Wernicke's area as a transmodal gateway for language; and identify the functions and syndromes of the posterior heteromodal cortex.

2. Identify the prefrontal heteromodal cortex and frontal lobe syndromes; list the paralimbic (mesocortical) areas and limbic structures and describe their functions; know the structure and function of the amygdala, hippocampus, limbic system, basal ganglia, cerebellum, thalamus, and the ascending reticular activating system; identify the primary specializations of the cerebral hemispheres and the distributed large-scale networks and their cortical epicenters (human connectome).

3. Describe the biology of the attentional matrix in brain; understand the composition and functionality of the ascending reticular activating system (ARAS); list the clinical characteristics, causes, course, and outcome of acute confusional states; understand neglect syndromes as disorders of spatial attention; describe the functional anatomy of unilateral neglect and right hemisphere dominance for neglect; and compare the causes, course, and treatment of unilateral neglect to other components of the right hemisphere syndrome.

4. Define memory and describe its disorders; list the anatomical substrates of the major subcomponents of memory; and know the primary amnesia syndromes, their anatomical basis, etiologies, course, and outcomes.

5. Compare and contrast the major classical aphasias including Broca's, Wernicke's, conduction, global, and the transcortical aphasias; describe the language impairments following damage outside of the classic language territories (e.g., basal ganglia, thalamus); know the primary progressive aphasias; understand the linguistic characteristics of sign language; describe the role of the nondominant hemisphere in language; and list our current understanding of recovery and aphasia management.

6. Examine the neurology of prosody and know its subtypes; describe the neurology of kinesics (gesture, pantomime); list and detail the components of the aprosodias; know how to conduct a clinical

examination of affective prosody and gesture; understand the hemispheric lateralization of affective prosody and the callosal integration of language functions; and compare the aprosodia display behaviors and emotional experience.

7. Describe the pattern recognition agnosias; list the other types and aspects of visual agnosias including facial emotion, nonconscious recognition, cortical blindness, Anton's syndrome, alexia without agraphia, and disorders of topographical (spatial) orientation; know the functional anatomy of the achromatopsias; list and understand the neurology of other disorders related to color vision; and describe the major disorders of spatial analysis (including Balint's syndrome, stereopsis, and cerebral akinetopsia), disturbances of constructional ability, and disturbances in the ability to dress.

COURSE REQUIREMENTS

To pass the course requirements and earn continuing education credits or certificates of completion, students must 1) complete all multiple-choice posttest examinations, earning a cumulative percentage of >74% correct and 2) participate in assigned course discussions by responding to at least one online discussion question for each module and posting them onto the course discussion board. The DistanCE online system automatically records performance on the multiple-choice quizzes, which may be taken multiple times.

SCHEDULE

Week 1:
Introduction to Course
Review Course Syllabus and Requirements
Log into the DistanCE Website
Obtain Materials
Begin Module 1: Behavioral Neuroanatomy: Large Scale Networks and Association Cortices
Mesulam: Chapter 1: pp. 1 – 41
Supplemental Reading:

Jacobs, B., Schall, M., Prather, M., Kapler, E., Driscoll, L., Baca, S., Jacobs, J., Ford, K., Wainwright, M., & Treml, M. (2001). Regional dendritic and spine variation in human cerebral cortex: A quantitative Golgi study. *Cerebral Cortex*, 11, 558-571.

Week 2:
Complete Module 1: Behavioral Neuroanatomy: Large Scale Networks and Association Cortices
Mesulam: Chapter 1: pp. 1 – 41
Complete Module 1 Quiz

Week 3:
Begin Module 2: Behavioral Neuroanatomy: Frontal Syndromes, Limbic System and Hemispheric Specialization
Mesulam: Chapter 1: pp. 41 – 94
Supplemental Reading:

Tekin, S. & Cummings, J.L. (2002). Frontal-subcortical circuits and clinical neuropsychiatry: An update. *Journal of Psychosomatic Research*, 53, 647-654.

Week 4:
Complete Module 2: Behavioral Neuroanatomy: Frontal Syndromes, Limbic System and Hemispheric Specialization
Mesulam: Chapter 2: pp. 41 – 94
Supplemental Reading:

Filippi, M., van den Heuvel, M.P., Fornito, A., He, Y., Hulshoff Pol, H.E., Agosta, F., Comi, G., & Rocca, M.A. (2013). Assessment of system dysfunction in the brain through MRI-based connectomics. *Lancet Neurology*, 12, 1189-1199.

Complete Module 2 Quiz

Week 5:
Begin Module 3: Attention, Confusional States, & Neglect Syndromes
Mesulam: Chapter 3: pp. 174-213
Supplemental Reading:

Kucyi, A., Hodale, M., & Davis, K.D. (2012). Lateralization in intrinsic functional connectivity of the temporoparietal junction with salience- and attention-related brain networks. *Journal of Neurophysiology*, 108, 3382-3392.

Week 6:
Complete Module 3: Attention, Confusional States, & Neglect Syndromes
Mesulam: Chapter 3: pp. 213-239
Supplemental Reading:

Vuilleumier, P. (2013). Mapping the functional neuroanatomy of spatial neglect and human parietal lobe functions: Progress and challenges. *Annals of the New York Academy of Sciences*, 1296, 50-74.

Complete Module 3 Quiz

Week 7:
Begin and Complete Module 4: Memory and Amnesias
Mesulam: Chapter 4: pp. 257-284
Supplemental Readings:

Markowitsch, H.J. & Staniloiu, A. (2012). Amnestic disorders. Lancet, 380, 1429-1440.

Eichenbaum, H. (2012). What H.M. taught us. *Journal of Cognitive Neuroscience*, 25(1), 14-21.

Complete Module 4 Quiz

Week 8:
Begin Module 5: Aphasias and Related Disorders
Mesulam: Chapter 5: pp. 294-310
Supplemental Readings:

Laforce Jr., R. (2013). Behavioral and language variants of frontotemporal dementia: A review of key symptoms. *Clinical Neurology and Neurosurgery*, 115, 2405-2410.

Week 9:
Complete Module 5: Aphasias and Related Disorders
Mesulam: Chapter 5: pp. 294-310
Supplemental Readings:

Harris, J.M. & Jones, M. (2014). Pathology in primary progressive aphasia syndromes. *Current Neurology and Neuroscience Reports*, 14, 466 (1-10).

Complete Module 5 Quiz

Week 10:
Begin and Complete Module 6: Affective Prosody and the Aprosodias
Mesulam: Chapter 6: pp. 316-326
Supplemental Readings:

Ross, E.D. & Monnot, M. (2008). Neurology of affective prosody and its functional-anatomic organization in right hemisphere. *Brain and Language*, 104, 51-74.

Ross, E.D. & Monnot, M. (2011). Affective prosody: What do comprehension errors tell us about hemispheric lateralization of emotions, sex and aging effects, and the role of cognitive appraisal? *Neuropsychologia*, 49, 866-877.

Complete Module 6 Quiz

Week 11:
Begin and Complete Module 7: Disorders of Complex Visual Processing
Mesulam: Chapter 7: pp. 332 – 364
Supplemental Readings:

Capitani, E., Laiacona, M., Pagani, R., Capasso, R., Zampetti, P., & Miceli, G. (2009). Posterior cerebral artery infarcts and semantic category dissociations: A study of 28 patients. *Brain*, 132, 965-981.

Martinaud, O., Pouliquen, D., Gerardin, E., Loubeyre, M., Hirsbein, D., Hannequin, D., & Cohen, L. (2012). Visual agnosia and posterior cerebral artery infarcts: An anatomical-clinical study. *PLoS ONE*, 7(1), e30433 (1-14).

Complete Module 7 Quiz

Week 12:
Includes 3 days at start of course to get logged on and upload bios of students
And 4 days at end of course to finish up loose ends in order to qualify for CE credits.