

JEFFERSON COLLEGE

COURSE SYLLABUS

OTA145

APPLIED NEUROLOGY

4 Credit Hours

Prepared by:

Lisa Martin MS, OTR/L

Occupational Therapy Assistant Program Director

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By:

Lisa Martin

Dena McCaffrey, Dean, Career and Technical Education
Kenneth Wilson, Division Chair, Health Occupation Programs

OTA145 Applied Neurology

I. CATALOGUE DESCRIPTION

- A. Prerequisite: OTA 110 Physical Dysfunction in Occupational Therapy, OTA 111 Physical Dysfunction Skills, OTA 125 Biomechanical Basis of Performance (all courses must be completed with a grade of “C” or better) and reading proficiency.
- B. 4 semester credit hours
- C. Description - Applied Neurology focuses on foundations of neuroscience for occupational therapy assistant practice. Principles of neurology as they relate to functioning, motor learning, reflex development and integration, and the impact of illness and disease on occupational performance will be addressed. Students examine common pathology of the nervous system with correlation of clinical presentation and related performance issues across the life span. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES (With numbers in parentheses referring to ACOTE standards)

Expected Learning Outcomes	Assessment Measures
Define terminology commonly used in neurorehabilitation. (B.1.1)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Identify the major components of the human neurological system including the major structures and functions of each as they relate to the Occupational Therapy Practice Framework, PEO, and treatment interventions. (B.1.1, B.1.2, B.2.11, B.4.1, B.4.2, B.4.4)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Distinguish between common signs of neurological disease and describe test to evaluate the nervous system. (B.1.1, B.1.2, B.2.11, B.4.4)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Distinguish between the functions of the central nervous system and the peripheral nervous system. (B.1.1)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Categorize the signs and symptoms with specific lesions of nervous system, including distinguishing between upper and motor neuron dysfunction. (B.2.11, B.4.4)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Review and report current medical literature regarding neurological pathologies and current treatment interventions. (B.1.1, B.1.2, B.2.11, B.4.1, B.4.2, B.4.4, B.5.2-B.5.14, B.5.17, B.5.20, B.8.3, B.8.7, B.8.8)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Apply foundational science, humanities, and the occupational therapy process to interventions for occupational therapy practice. (B.1.1-B.1.10,	Class Discussion/Activity Formative Assessment

B.2.1-B.2.11, B.5.1- B.5.14)	Written Project/Paper Summative Examination
Demonstrate appreciation for ethics and values of the profession of occupational therapy. (B.7.2, B.7.8, B.9.1, B.9.2, B.9.4, B.9.7, B.9.9- B.9.11, B.9.13)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination
Convey the importance of using evidence-based practice within the scope of neurological practice in occupational therapy.(B.8.1-8.3, B.8.7, B.8.8)	Class Discussion/Activity Formative Assessment Written Project/Paper Summative Examination

III. OUTLINE OF TOPICS

- A. Introduction to Neuroscience
- B. Basic Neuro-anatomy & neurophysiology
 - 1. Forebrain
 - 2. Diencephalon
 - 3. Midbrain
 - 4. Hindbrain
 - 5. Cranial Nerves
 - i. Cranial Nerve I: Olfactory
 - ii. Cranial Nerve II: Optic
 - iii. Cranial Nerves III, IV, and VI: Oculomotor, Trochlear, and Abducens
 - iv. Cranial Nerve V: Trigeminal
 - v. Cranial Nerve VII: Facial
 - vi. Cranial Nerve VIII: Vestibulocochlear Cochlea
 - vii. Auditory Function Within the Central Nervous System
 - viii. Cranial Nerve IX: Glossopharyngeal
 - ix. Cranial Nerve X: Vagus
 - x. Cranial Nerve XI: Accessory
 - 6. The neuron
- C. Lifespan Changes in the Nervous System
 - 1. Neurodevelopment
 - 2. Embryology of the Spinal Cord
 - i. Spina Bifida
 - 3. Synapse formation
 - 4. Aging and the Nervous System
 - 5. Physiological consequences of Neuronal Ageing
- D. The Brain Behavior Relationship
 - 1. Anatomical organization of the brain
 - i. Occipital Lobe
 - ii. Parietal Lobe
 - iii. Temporal Lobe
 - iv. Frontal Lobe
 - 2. Information Highways: Neural Connectivity

3. Functional Organization of the Cortex
 - i. Projection maps
 - ii. Functional maps
 - iii. Current Understanding of the Brain-Behavior Relationship
 4. Neuroplasticity
 - i. Anatomical Change
 - ii. Physiological Change
 - iii. Pharmacological Change
 5. Clinical Consequences of Plasticity in the CNS
- E. Factors Guiding Evaluation and Treatment
- F. General Evaluation Issues
- G. Movement and Coordination
1. Types of Movement
 - i. Reflex Movements
 - ii. Spasticity, Rigidity, Hypertonia and Contraction
 2. Motor Areas of the Brain
 - i. The Motor Cortex
 - ii. The Basal Ganglia
 - iii. Cerebellum
 3. Cerebral Palsy
- H. Perceptuo-motor Control
1. Coordination
 2. Motor Control: a Motor Programming Approach
 3. Other Approaches to Motor Control
 4. Motor Control in Context
- I. Motor Learning
1. The Learning Curve: Performance Versus Learning
 2. Perceptuo-motor Learning: What do we Learn
 3. Stages of Learning
 4. Facilitating Skill Acquisition
 - i. Motivation
 - ii. Practice
 - iii. Feedback
 5. Transfer Hypothesis
- J. Spinal Region
1. Anatomy of the Spinal Region
 2. Movements of the Central Nervous System
 3. Functions of the Spinal Cord
 4. Spinal Cord Motor Coordination
 5. Effects of Segmental and Tract Lesions in the Spinal Region
 6. Spinal Region Syndromes
 7. Effects of Spinal Region Dysfunction on Pelvic Organ Function
 8. Traumatic Spinal Cord Injury
 9. Specific Disorders Affecting Spinal Region Function

10. Red Flags for the Spinal Region

- K. Disorders of Communication
 1. Introduction: Overview of Speech and Language Processing
 2. Aphasia: Brain-behavior Relationship
 - i. Broca's Area
 - ii. Wernicke's Area
 3. Aphasia: Clinical Presentation
 - i. Expressive Versus Receptive Aphasia
 - ii. Fluent Versus Non-fluent Aphasia
 - iii. Boston Aphasia Classification System
 4. Broca's Aphasia
 5. Wernicke's Aphasia
 6. Conduction Aphasia
 7. Global Aphasia
 8. The Role of the Right Hemisphere in Communication
 9. Motor Speech Disorders
 - i. Dysarthria
 - ii. Apraxia of Speech
 10. Non-verbal Communication
 11. Implications for Rehabilitation

- L. Apraxia
 1. Ideomotor Apraxia
 2. Ideational Apraxia
 3. Limb-Kinetic Apraxia
 4. Oral Apraxia
 5. Constructional Apraxia
 6. Dressing Apraxia

- M. Disorders of Sensation & Perception
 1. Sensation
 2. Vision
 - i. Retina
 - ii. Visual Pathways
 - iii. Cerebral Hemispheres
 - iv. Binocular Vision
 3. Perception
 4. Pain and Analgesia

- N. Visual Processing
 1. Modified Information Processing Theory
 2. Warren's Hierarchical Model of Visual Processing
 3. Evaluation and Treatment of Visual Skills
 4. General Guidelines for Visual Processing Skills Evaluation
 5. Pupillary Response
 6. Visual Acuity
 7. Contrast Sensitivity
 8. Ocular Alignment
 9. Visual Fields

10. Oculomotor Control
11. Visual Fixation
12. Saccadic Eye Movements
13. Smooth Pursuit Eye Movements
14. Organized Scanning
15. Convergence and Accommodation
16. Diplopia
17. Visual Inattention
18. Visual/Vestibular Processing

O. Body Scheme Disorders

1. Body Scheme
2. Autotopagnosia
3. Unilateral Body Neglect
4. Anosognosia
5. Right-Left Discrimination
6. Finger Agnosia

P. Visual Discrimination Skills

1. Form Discrimination
2. Depth Perception (Stereopsis)
3. Figure-Ground Perception
4. Spatial Relations
5. Topographical Disorientation
6. Additional Test Batteries of Visual Discrimination/Perception

Q. Agnosia

1. Visual Agnosia
2. Visual Object Agnosia
3. Prosopagnosia
4. Color Agnosia
5. Metamorphopsia
6. Visual-Spatial Agnosia
7. Topographagnosia
8. Environmental Agnosia
9. Tactile Agnosia
10. Auditory Agnosia
11. Agnosia Related to Body-Scheme Disorders

R. Orientation, Attention and Memory

1. Orientation
2. Attention
3. Sensory, Perceptual, and Working Memory
4. Implicit and Explicit Memory
5. Declarative and Non-declarative (Procedural) Memory
6. Prospective Memory
7. Semantic and Episodic Memory
8. Long-Term Memory

- S. Executive Function
 - 1. Evaluation and Treatment of Self-Awareness and Monitoring
 - 2. Evaluation and Treatment of Executive Function
 - 3. Initiation
 - 4. Planning and Organization
 - 5. Problem Solving
 - 6. Decision Making
 - 7. Categorization
 - 8. Mental Flexibility
 - 9. Abstraction
 - 10. Generalization and Transfer
 - 11. Occupation-Based Evaluations of Executive Function

IV. METHOD(S) OF INSTRUCTION

- A. Lecture
- B. Readings from textbook and supplemental handouts
- C. Classroom activities
- D. Participation in active learning by computer programs, games, and internet-based activities
- E. Peer interactive activities, group projects, and discussions in classroom and online

V. REQUIRED TEXTBOOKS

- A. Zoltan, B. (Current Edition). *Vision, perception, and cognition, a manual for the evaluation and treatment of the neurologically impaired adult*. Thorofare, NJ: Slack Inc
- B. McBean, D., and VanWijck, F. (Current Edition). *Applied neuroscience for the allied health professions*.: Churchill Livingstone Elsevier Ltd

VI. REQUIRED MATERIALS

- A. Course homepage available through Blackboard
- B. A computer with internet access (available through the Jefferson College Labs)
- C. Paper, notebooks, pens, pencils with erasers

VII. SUPPLEMENTAL REFERENCES

- A. Class Handouts
- B. Current Library Resources
 - 1. Books - Netter, F. (2011). *Atlas of human anatomy* (5th ed.). St. Louis, MO: Saunders-Elsevier
 - 2. Periodicals
 - 3. Videos
- C. Current internet resources
 - 1. On-line reference materials
 - 2. Textbook companion web-site
 - 3. American Occupational Therapy Association (AOTA) web-site

VIII. METHOD OF EVALUATION (basis for determining course grade)

- A. Formative Assessment/Written Projects or Papers will equal 20% of total course grade. Consisting of 1-5 assignments focused on application of occupational therapy theory and principles
- B. Summative Written Examinations – 3-5 examinations worth up to 60%
- C. Attendance/Participation/Classroom Discussion/Activity – grade will equal 10% of total course grade
- D. Additional Credit – Additional activities, community service, or exemplary professional behaviors as assessed by a professional behaviors checklist will equal 10% of total course grade
- E. Grading Scale:
 - A = 90-100%
 - B = 80-89.9%
 - C = 70-79.9%
 - D = 60-69.9%
 - F = 0-59.9%

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services located in the library. (Phone: 636-797-3000, ext. 169.)

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook. Any student who cheats or plagiarizes will be subject to dismissal from the Occupational Therapy Assistant Program and will be referred to the college for disciplinary action. (See College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details. Student's grade will also be based on participation in class and attendance.

XII. OUTSIDE OF CLASS ACADEMICALLY-RELATED ACTIVITIES

The US Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically-related activities such as reading, studying, and completing assignments. Specifically, time spent on academically-related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.