

SYLLABUS

NAME OF COURSE: Neurologic Examination (DIAG-237)

LENGTH OF COURSE: 2 units, 33 hours (3 hours lecture/week)

COURSE DESCRIPTION: These courses cover the examination procedures used to evaluate nervous system function, differentiation of normal and abnormal exam results, and localization of the lesion. (This course includes discussion of the physiology of nervous system function, and nervous system pathology.)

PREREQUISITES: DIAG-239, PHPA-212

CO-REQUISITES: DIAG-737, DIAG-226

This course will involve the clinical application of neuroanatomy and neurophysiopathology.

It is essential that you have a basic working knowledge of :

1. peripheral nerve motor and sensory functions
2. basic structure of the CNS
3. basic nervous system functions (sensory, motor)

Peripheral Neuroanatomy	ANAT-114
Central Nervous System	ANAT-137
Spinal Anatomy	ANAT-118
Neuromuscular Physiopathology I	PHPA-131
Neuromuscular Physiopathology II	PHPA-212

COURSE OFFERED BY: Clinical Sciences Department

REQUIRED TEXTS: 1. **Strutin N. Neuro Exam Lect notes (Canvas)**

2. **Strutin N. Neuro Exam Lab Manual (Canvas)**

RECOMMENDED TEXTS: 1. Blumenfeld H. Neuroanat Through Clinical Cases. 2nd ed,2010

2. Bickley LS. Bates' Guide to Physical Examination and History Taking. 11th ed. 2012

3. Cipriano J. Photographic Manual of Regional

Orthopedic and Neurological Tests. 5th ed. 2010

4. Fuller G. Neurological Examination Made Easy. 5rd ed. 2013
5. Hoppenfeld S. Physical Examination of the Spine & Extremities. 1976
6. Hoppenfeld S. Orthopedic Neurology: A Diagnostic Guide to Neurologic Levels. 1977
7. Magee D. Orthopedic Physical Assessment. 6th ed. 2013

REFERENCE TEXTS:

1. Biller J, DeMyer's The Neurologic Examination: A Programmed Test. 6th ed. 2011

MATERIALS (lab):

Disposable pinwheels; cotton Q-tips, 128 Hz tuning fork, reflex hammer

METHOD OF INSTRUCTION: lecture, demonstration, discussion; Lab

EVALUATION:

A Superior Work	90-100%
B Above Average Work	80-89%
C Average Work	70-79%
F Failure (the student must REPEAT the course)	below 70%
I Incomplete: The student has failed to take all required exams and/or has failed to turn in other required work.	
0 Overcut: The student has accumulated more than the allowable absences in the course.	

LECTURE: exams will consist of x-choice, T/F, and written questions (in any combination or proportion).

MT 1 (wk 5, Thurs):	25%
MT 2 (wk 9, Thurs):	25%
Final (comprehensive):	50%
Assignments:	pass/fail

Assignments will be distributed in class, and if necessary may be printed from CANVAS.

Assignments must be handwritten. Make a copy for yourself as the assignment will not be returned.

Assignments are due **by the end of roll call on the assigned day** (usually Monday; except week 1 assignment which is due Thurs).

A 2-point deduction from the midterm 1 grade will immediately apply for late assignments, and point deductions will continue to accrue at 2-points/day until the assignment is received.

Assignments handed in on time that, in the judgment of the instructor, do not demonstrate a satisfactory attempt to complete the assignment, will receive a **5-point deduction** from the midterm 1 grade, and will need to be resubmitted.

EXTRA CREDIT: There will be no extra credit work permitted in this class.

INDEPENDENT STUDENT WORK: All exams must be the product of the individual student's original efforts for this class. Collaboration on other class assignments is permitted as defined by the instructor.

Grades and the Grading System Final Grades are available online through the CAMS student portal. If there are any questions on grading procedures, computation of grade point average, or the accuracy of the grade report, please contact the Registrar's Office or the Office of Academic Affairs. Grades will be reported and evaluation will be based on the Academic Policies, Procedures, & Services. Please refer to Evaluation Policy (**Policy ID: OAA.0007**)

In order to maintain **Satisfactory Academic Progress**, a student must maintain a 2.0 or better in each and every course. **Any grade less than a C must be remedied by repeating the class.** Please refer to Satisfactory Academic Progress (**Policy ID: OAA.0006**)

Attendance: Please refer to Attendance Policy (**Policy ID: OAA.0002**)

Conduct and Responsibilities: Please refer to the Personal Conduct, Responsibility and Academic Responsibility Policy (**Policy ID: OAA.0003**)

Make-up Exams: Please refer to Make-up Assessment Policy (**Policy ID: OAA.0001**)

Request for Special Testing: Please refer to Request for Special Testing (**Policy ID: OAA.0004**)

Accommodation for Students with Disabilities:

If you have approved accommodations, please make an appointment to meet with your instructor as soon as possible. If you believe you require an accommodation, but do not have an approved accommodation letter, please see the Academic Counselor Lori Pino in the Office of Academic Affairs. Contact info: Lpino@lifewest.edu or 510-780-4500 ext. 2061. Please refer to Service for Students with Disabilities Policy (**Policy ID: OAA.0005**)

Electronic Course Management:

Canvas is LCCW's Learning Management System (LMS). Canvas will be used throughout the quarter during this course. Lectures, reminders, and messages will be posted. In addition, documents such as the course syllabus and helpful information about the class project will be posted. Students are expected to check Canvas at least once a week in order to keep updated. The website address for Canvas is <https://lifewest.instructure.com/login/canvas> Please refer to the Educational Technologies Policy (**Policy ID: OAA.0009**)

COURSE GOAL: The goal of this course is to prepare the student to be able to perform a standard neurologic examination, and to understand normal & abnormal, and the significance of abnormal findings.

COURSE OBJECTIVES: (also see week-by-week lecture/lab schedule below)

- review the anatomic relationships between spinal nerves, discs, and IVFs
- review the anatomy of peripheral nerves of the upper and lower extremities and potential entrapment/compression sites
- describe/demonstrate the sensory (dermatome), motor (myotome), and reflex functions of spinal nerves
- review the cervical and lumbosacral orthopedic examinations that are utilized to identify radiculopathy
- describe/demonstrate the sensory, motor, and reflex functions of the peripheral nerves of the upper and lower extremities
- illustrate the analytic processes used to diagnose and DDx radiculopathies
- illustrate the analytic processes used to diagnose and DDx peripheral neuropathies
- illustrate the analytic process used to DDx radiculopathy and peripheral neuropathy
- identify the neuroanatomic causes of weakness
- describe the S&S that help DDx UMN & LMN lesions
- discuss NMJ pathologies, and their S&S; discuss diagnostic tests for Myasthenia Gravis
- discuss myopathy, its S&S and diagnostic tests
- discuss the etiology of somatosensory alterations
- describe the somatosensory alterations associated with spinal cord pathology (syringomyelia, Brown-Sequard syndrome, etc.)
- describe the somatosensory alteration associated with dorsolateral medullary (Wallenberg) syndrome
- describe/demonstrate the examination procedures to identify agnosia (“astereognosis”, “agraphognosis”, “extinction”)
- describe/demonstrate the examination procedures used to assess balance (Romberg test, etc.)
- describe/demonstrate the examination procedures used to assess gait (regular, tandem, heel& toe)
- describe/demonstrate the examination procedures used to assess coordination of the limbs (point-to-point tests, rapid alternating movement tests)
- discuss the terminology used to describe limb coordination problems (ataxia, dysmetria, dysdiadochokinesis)
- describe/demonstrate the pathologic reflex tests for the upper & lower extremities
- describe/demonstrate the abdominal and plantar superficial reflex tests
- describe the cremasteric and anal superficial reflex tests
- describe the basic procedures to assess mental status
- differentiate Wernicke’s and Broca’s aphasia

STUDENT LEARNING OUTCOMES (SLOs):

1. The student will be able to discuss basic clinically relevant anatomy and physiology of the nervous system. [PLO: 1,4]
2. The student will be able to describe/demonstrate the procedures of a standard neurologic examination, including; [PLO: 1,4,8]
 - a. station and gait
 - b. motor system
 - c. sensory system
 - d. reflexes
 - e. mental status and language (brief)
 - f. cranial nerves (covered in Exam: EENT)
3. The student will be able to describe/perform the sensory, motor, and reflex examination procedures to assess the neurologic function/integrity of spinal nerves, peripheral nerves, and the CNS. [PLO: 1,4]
4. The student will be able to describe the normal & abnormal findings for each standard neurologic examination procedure, and discuss the significance of each abnormal finding. [PLO; 1,3,4,8]
5. The student will be able to identify/differentiate spinal nerve disorders, peripheral nerve disorders, from each other, and from CNS disorders based upon neurologic examination findings, integrated with information from the history, physical, and orthopedic examination. [PLO: 1,4,8]
6. The student will be able to discuss the major symptoms, signs, and exam findings associated with _____. [PLO: 1,4,8]
 - a. radiculopathy
 - b. peripheral neuropathy
 - c. cauda equina syndrome
 - d. UMN lesions and LMN lesions (compare & contrast)
 - e. spinal cord disorders (syringomyelia, Brown-Sequard syndrome)
 - f. brainstem disorders (dorsolateral medullary syndrome)
 - g. cerebellar disorders
 - h. basal ganglia disorders (Parkinson disease)

Program Learning Outcomes (PLO): Students graduating with a Doctor of Chiropractic degree will be proficient in the following:

1. **ASSESSMENT AND DIAGNOSIS:** An assessment and diagnosis requires developed clinical reasoning skills. Clinical reasoning consists of data gathering and interpretation, hypothesis generation and testing, and critical evaluation of diagnostic strategies. It is a dynamic process that occurs before, during, and after the collection of data through history, physical examination, imaging, laboratory tests and case-related clinical services.
2. **MANAGEMENT PLAN:** Management involves the development, implementation and documentation of a patient care plan for positively impacting a patient's health and well-being, including specific therapeutic goals and prognoses. It may include case follow-up, referral, and/or collaborative care.
3. **HEALTH PROMOTION AND DISEASE PREVENTION:** Health promotion and disease prevention requires an understanding and application of epidemiological principles regarding the nature and identification of health issues in diverse populations and recognizes the impact of biological, chemical, behavioral, structural, psychosocial and environmental factors on general health.
4. **COMMUNICATION AND RECORD KEEPING:** Effective communication includes oral, written and nonverbal skills with appropriate sensitivity, clarity and control for a wide range of healthcare related activities, to include patient care, professional communication, health education, and record keeping and reporting.
5. **PROFESSIONAL ETHICS AND JURISPRUDENCE:** Professionals comply with the law and exhibit ethical behavior.
6. **INFORMATION AND TECHNOLOGY LITERACY:** Information literacy is a set of abilities, including the use of technology, to locate, evaluate and integrate research and other types of evidence to manage patient care.
7. **CHIROPRACTIC ADJUSTMENT/MANIPULATION:** Doctors of chiropractic employ the adjustment/manipulation to address joint and neurophysiologic dysfunction. The adjustment/manipulation is a precise procedure requiring the discrimination and identification of dysfunction, interpretation and application of clinical knowledge; and, the use of cognitive and psychomotor skills.
8. **INTERPROFESSIONAL EDUCATION:** Students have the knowledge, skills and values necessary to function as part of an inter-professional team to provide patient-centered collaborative care. Inter-professional teamwork may be demonstrated in didactic, clinical or simulated learning environments.
9. **BUSINESS:** Assessing personal skills and attributes, developing leadership skills, leveraging talents and strengths that provide an achievable expectation for graduate success. Adopting a systems-based approach to business operations. Networking with practitioners in associated fields with chiropractic, alternative medicine and allopathic medicine. Experiencing and acquiring the hard business skills required to open and operate an on-going business concern. Participating in practical, real time events that promote business building and quantifiable marketing research outcomes
10. **PHILOSOPHY:** Demonstrates an ability to incorporate a philosophically based Chiropractic paradigm in approach to patient care. Demonstrates an understanding of both traditional and contemporary Chiropractic philosophic concepts and principles. Demonstrates an understanding of the concepts of philosophy, science, and art in chiropractic principles and their importance to chiropractic practice.

WEEKLY OUTLINE (subject to change due to holidays, school cancellations, etc.)		
WEEK	LECTURE	LAB
Week 1	a. syllabus and introduction to the course b. principles of neurologic examination and diagnosis (I) (1) components of the complete patient assessment (2) components of the neurologic exam (3) components of the motor, sensory, and reflex examinations (4) summary of the neurologic examination c. diagnosis of radiculopathy (1) relationship between spinal nerves, vertebra, & discs (2) spinal nerve (dermatome) and peripheral nerve sensory distributions	Sensory testing: a. pinprick (pinwheel) b. temperature c. vibration (128 tuning fork) d. light touch (wisp of cotton) e. joint position sense (JPS)/conscious proprioception f. 2-point discrimination (paper clip and mm ruler)
Week 2	a. diagnosis of radiculopathy (continued) (1) motor and reflex functions of spinal nerves (2) radiculopathy case presentations and analysis - UE (Blumenfeld Chapter 8, etc.)	Motor assessment - upper extremity a. inspection for atrophy and fasciculations b. girth/circumference measurement (flexible tape measure) c. muscle strength testing d. dynamometer testing of grip strength
Week 3	a. diagnosis of radiculopathy (continued) (1) radiculopathy case presentations and analysis – LE (Blumenfeld Chapter 8, etc.)	Motor assessment - lower extremity a. inspection for atrophy and fasciculations b. girth/circumference measurement (flexible tape measure) c. muscle strength testing
Week 4	a. Diagnosis of peripheral neuropathy (1) review peripheral nerve anatomy & function (2) common peripheral entrapment/compression neuropathies c. peripheral neuropathy case presentations and analysis	Deep tendon reflexes (DTRs) - upper and lower extremities (reflex hammer)

Week 5	<ul style="list-style-type: none"> a. finish peripheral neuropathy case presentations and analysis, as nec. b. Q & A regarding radiculopathy & peripheral entrapment neuropathy diagnosis c. DDx radiculopathy & peripheral neuropathy d. sclerogenic (connective tissue) pain e. NMJ disease d. Myopathy g. S/S and examination findings that would suggest CNS pathology vs. PNS pathology (introduction) h. Q&A regarding assignment questions, as necessary i. final prep for MT1 j. MT 1 (Thurs.): 	<p>Integration of sensory, motor, and reflex testing for assessment of spinal nerve and peripheral nerve function (all above instruments needed)</p>
Week 6	<p>CNS aspects of motor control</p> <ul style="list-style-type: none"> a. review UMN and LMN anatomy b. characteristics of UMN and LMN lesions c. examples of UMN & LMN lesions 	<ul style="list-style-type: none"> a. reflex examination – revisited <ul style="list-style-type: none"> (1) pathologic reflexes (2) clonus (3) superficial reflexes b. sensory examination – revisited <ul style="list-style-type: none"> (1) cortical sensory tests (gnosis)
Week 7	<p>CNS aspects of motor control (continued)</p> <ul style="list-style-type: none"> a. station/Romberg test b. gait c. coordination of the limbs <ul style="list-style-type: none"> (1) review relevant cerebellar anatomy (2) examination procedures 	<ul style="list-style-type: none"> a. station & Romberg test b. gait (regular, tandem, heel-to-toe) c. coordination of the limbs
Week 8	<p>CNS aspects of motor control (continued)</p> <ul style="list-style-type: none"> a. muscle bulk b. muscle tone b. involuntary movements c. Basal Ganglia anatomy review <p>CNS aspects of somatosensory transmission</p> <ul style="list-style-type: none"> a. dorsal column-medial lemniscus (tactile pathway) b. anterolateral system (pain/temp pathway) c. cortical discriminative sensation (gnosis) 	<p>Review/catch up</p>

Week 9	CNS aspects of somatosensory transmission (continued) MT2 (Thurs)	Review / catch-up Prep for lab practical
Week 10	CNS effects on reflex activity a. deep tendon reflexes b. pathologic reflexes c. superficial reflexes Mental status and language	Lab practicals
Week 11	Final	Lab practicals (as necessary due to class size)