

SYLLABUS

Name of Course: Biomechanics and Examination of the Extremities – DIAG 327/827(lab)

Length of Course: 53 Hours (3 Hours Lecture, 2 Hour Lab/Wk), 3 Units

Course Description: This course is designed to instruct the student in extremity biomechanics, extremity physical examination procedures, and extremity orthopedic testing procedures. The student will learn the basic biomechanics of the extremities; the relationship of lower extremity biomechanics to the spine and pelvis; the relationship of abnormal biomechanics to injury; the performance and interpretation of standard orthopedic tests of the extremities; and the recognition and diagnosis of the major pathological conditions affecting the extremities.

Prerequisites: ANAT-126, PHPA-212, PATH-315

Required Texts: Class Notes

Recommended Texts: Hertling D *Management of Common Musculoskeletal Disorders*. 4th ed. 2006
Hoppenfeld S Physical Examination of the Spine & Extremities. 1976

Reference Texts: Magee DJ *Orthopedic Physical Assessment*. 5th ed. 2008
Hammer WI *Functional Soft Tissue Examination & Treatment by Manual Methods: New Perspectives*. 2nd ed. 1999 also have 3rd ed. 2007

Materials: None

Method of Instruction: Lecture, Demonstration, and Student Hands-On Practice Of Tests and Exam Procedures.

Evaluation:

Quizzes:	50 %
Lab Final:	12.5 %
Written Final	37.5 %

A	(4.0)	Superior work	90-100%
B	(3.0)	Above average work	80-90%
C	(2.0)	Average work	70-79%
F	(0.0)	Failure-The student must repeat the entire course	below 70%

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 Student will learn the basic biomechanics of the appendicular joints, the relationship of lower extremity biomechanics to the spine and pelvis, the relationship of abnormal biomechanics to injury, the performance and interpretation of standard orthopedic tests of the extremities, as well as the recognition and diagnose of the major pathological conditions affecting the extremities.

Course Objectives:

Week 1

1. Instructor will welcome the students to class, call roll, review this document, make appropriate changes and address any questions or points of clarification.
2. Review basic ideas of clinical biomechanics including:
 - A. lever systems/musculoskeletal system
 - B. joint integrity : muscle, ligament, bone
 - C. altered joint biomechanics and altered function
 - D. connective tissue properties
 - E. reparative nature of soft tissues
3. Discuss Extremity Examination and Orthopedic
 - A. Principles and their application
 - B. History
 - C. The relevance of the chief complaint and other subjective findings
 - D. Active, passive and resisted isometric ranges of motion
 - E. Joint and feel in passive range of motion

Week 2-3

Shoulder

1. The Instructor will review and demonstrate the following topics
 - A. general anatomy review
 - B. biomechanics of the shoulder
 1. Scapula-humeral rhythm
 2. Capsular action in internal and external rotation, flexion and extension
 3. Rotator cuff mechanics
2. Explain common shoulder injuries and demonstrate MOIs
 - A. AC joint separation
 - B. rotator cuff tear
 - C. calcific tendonitis
 - D. bursitis
 - E. biceps tendon injury

- F. shoulder dislocation
 - G. shoulder subluxation
 - H. SC joint separation
 - I. thoracic outlet syndrome
3. Demonstrate Physical Examination of the Shoulder including inspection (I), palpation (P), ROM and the following Orthopedic Tests of the Shoulder:
 - A. Apley's Scratch Test
 - B. Shoulder Apprehension Test
 - C. Shoulder Arm Drop Sign
 - D. Yergason's Test
 - E. Duga's Test
 - F. Clunk T.
 - G. Jobe's and other muscle tests
 4. Offer guidance and hands on feedback to individual students as they perform and practice these procedures.

Week 4

Elbow

1. The Instructor will review and elaborate on the following:
 - A. general anatomy review
 - B. biomechanics of the elbow
 1. Collateral ligaments
 2. Throwing analysis
 3. Rotational stress
2. The instructor will describe and demonstrate the MOIs of common elbow injuries:
 - A. sprain/strain
 1. Medial flexor - pronator muscle
 2. Medial collateral ligament
 - B. elbow dislocation
 - C. ulnar nerve injuries
 - D. olecranon bursitis
 - E. lateral epicondylitis (tennis elbow)
 - F. medial epicondylitis (golfer's elbow)
3. The Instructor will model physical examination of the Elbow including I,P, ROM and
 1. Elbow Ligamentous Stability Test
 2. Mill's Test
 3. Cozen's Test
 4. Wrist Flexor Test
 5. Tinel's Sign
4. Provide guidance and feedback as students perform these procedures

Week 5

Wrist and Hand

1. Provide the following background
 - A. general anatomy review
 - B. biomechanics of the wrist/hand

1. Fall in outstretched arm
2. Lunate action
2. Describe common wrist & hand injuries
 - A. fall on outstretched arm
 - B. stenosing tenosynovitis (De Quervains syndrome)
 - C. sprain/strains
 1. Collateral ligaments of fingers
 - D. finger dislocation
 - E. dupuytron's contractures
 - F. nerve entrapment syndromes
 - G. DJD
 - H. RA
3. Demonstrate Physical Examination of the Wrist and Hand including I, P, ROM and Orthopedic Tests of the Wrist and Hand:
 - A. Finkelstein's Sign
 - B. Phalen's Sign
 - C. Reverse Phalen's
 - D. Froment's Sign
 - E. Pinch Test
 - F. Handshake Test
4. Provide feedback

Week 6

Hip

1. Instructor will review and elaborate on the anatomy and biomechanics including
 - A. femoral anterversion/retroversion
 - B. internal/external rotation
 - C. angle of inclination
 - D. hip ligaments and musculature
2. Will describe common lesions of the hip including
 - A. DJD
 - B. bursitis
 - C. SFCE
 - D. flexor tightness
3. Instructor will demonstrate Physical Examination of the Hip and Pelvis:
 - A. I, P, ROM
 - B. Orthopedic Tests of the Hip and Pelvis
 1. Ober's test
 2. Patrick's FABERE Test
 3. Trendelenberg's Test
 4. Thomas test
 5. Anvil Test
4. Provide guidance and feedback

Week 7-8

Knee

1. We will focus on the functional anatomy and biomechanics of the knee including:
 - A. tibial rotation w/pronation & supination
 - B. "screw-home" mechanism
 - C. meniscus
 - D. ligaments
 - E. musculature
2. Instructor will describe some common injuries to knee and the MOIs:
 - A. collateral ligament
 - B. cruciate ligament injury
 - C. rotatory instabilities
 - D. meniscus injuries
 - E. patellar subluxation
patellar femoral tracking
 - F. chondromalacia patella
 - G. pes anserine bursitis
 - H. hamstring pull
 - I. quadriceps contusions
 - J. iliotibial band syndrome
 - K. Osgood Schlatter's
3. Instructor will demonstrate physical examination of the knee:
 - A. I, P, ROM
 - B. General Orthopedic tests:
 - Joint effusion tests
 - Bulge test (test for minor effusion) Grinding test
 - Bounce home
 - C. Tests for patella dislocation
 - Apprehension test
 - D. Tests for meniscus injury
 - Steinman's tenderness displacement test
 - McMurry's test
 - Apley's compression test
 - Hyperflexion meniscus test
 - E. Tests for ligamentous instability
 - valgus stress test
 - varus stress test
 - Lachman's test Anterior drawer test genu recurvatum test sag sign posterior drawer test antero medial rotary instability anterolateral rotary instability Lateral pivot shift test (of McIntosh) ALRI test (of Slocum) posterolateral rotary instability posteromedial rotary

instability

4. Give feedback and criticism as students practice the procedures

Week 9

Foot/Ankle

1. Review the anatomy and biomechanics of the ankle and foot including:
 - A. bones, ligaments and musculature
 - B. tibio-talar joint function
 - C. pronation/supination of the rearfoot
 - D. classical gait cycle
 - E. windlass mechanism
2. Discuss some common injuries to foot/ankle
 - A. hyperpronation vs. hypersupination
 - B. ankle sprains / high ankle sprains
 - C. plantar fasciitis/ calcaneal spurs
 - D. bursitis/tendonitis/tenosynovitis
 - E. Achilles tendonitis
 - F. shin splints /compartment syndromes
3. Instructor will demonstrate how to perform a physical examination of the foot and ankle in the same format that we have been practicing all quarter:
 - A. I, P, ROM
 - B. Orthopedic Tests of the Foot and Ankle including:
 - Ankle Lateral/Medial Instability Test
 - Anterior Drawer Test
 - Functional Hallux Limitus test
 - C. Feedback

Week 10

Review of course material and preparation for cumulative final exam and practical exam

- A. Comprehensive review
- B. Practical exam

Week 11 Final exam

Student Learning Outcomes , (related Program Learning Outcomes) :

1. The student will be able to discuss the basic format for the examination of the extremities.(PLO: 1,2,8)
2. The student will be able to explain the basic biomechanical principles involved in testing each joint.(PLO: 1,8)
3. The student will be able to describe/demonstrate each orthopedic exam covered, discuss each exam's abnormal findings, and its significance/interpretation. (PLO: 1,2,8)
3. The student will be able to identify orthopedic exams that are appropriate to assess common pathophysiologies affecting each joint. (PLO: 1,2,8)

4. The student will be able to visualize bony and soft tissue landmarks, recognize common anomalies and pathologies.(PLO: 1)
5. The student will be able to statically palpate bony landmarks, joints and muscles.(PLO: 1)
6. The student will be able to test the ROM of each joint, identifying normal ROM, or restricted ROM or hypermobility. (PLO: 1,8)
7. The student will be able to perform a standard examination of the upper and lower extremity.(PLO: 1,2,8)

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.