

SYLLABUS

Name of Course: Biomechanics of the Spine - TECH-216

Length of Course: 3.5 units, 55 Hours (5 hours lecture)

Course Description: This course focuses on the spine and how it works as a functional biomechanical unit. The individual joints of the spine are studied, as well as basic principles of biomechanics and kinematics.

Prerequisites: ANAT-118, ANAT-128

Course Offered by: Technique Department

Department Objective: To give to our students, freely and out of abundance, the best of our knowledge and skills. To develop the most talented of chiropractors that they may with skill, both find and correct the vertebral subluxation. To do this for the overall betterment, health, and well-being of their patients and the world.

Required Texts: 1. White & Paujabi *Clinical Biomechanics of the Spine* 2nd Edition 1990

Recommended Texts:

2. Kapandji IA *The Physiology of the Joints. (V.1 Upper Limb, v2 Lower Limb, or v.3 Trunk & vertebral column)??*
3. Harrison DD *Spinal Biomechanics: a Chiropractic Perspective.* 1992
4. Foreman SM *Whiplash Injuries: the Cervical Acceleration Deceleration Syndrome.* 3rd ed. 2002
5. Kirkaldy-Willis WH: *Managing Low Back Pain.* 4th ed. 1999
6. Plaugh G *Textbook of Clinical Chiropractic: a Specific Biomechanical Approach,* 1993
7. Cramer GD *Basic and Clinical Anatomy of the Spine, Spinal Cord and ANS.* 2nd ed. 2005
8. Bogduk N *Clinical Anatomy of the Lumbar Spine and Sacrum.* 4th ed. 2005
9. Standring S Gray's *Anatomy: the Anatomical Basis of Clinical* 39th ed. 2005
10. Yochum TR *Essentials of Skeletal Radiology.* 3rd ed. 2005

Reference Text: See above

Materials: Lecture with overheads, videos, discussion & demonstration.

Evaluation: approximations

<u>Description</u>	<u>Points</u>			
Mid-Term 1	75 points	A – 4.0	Superior	90 – 100%
Mid-Term 2	75 points	B – 3.0	Above Average	80 – 89%
Comp Final	75 points	C – 2.0	Average	70 – 79%
<u>Assignments/Discussion</u>	<u>25 points</u>			
Total	250 points	F – 0.0	Fail-repeat class	00 – 69%

Extra Credit: There will be no extra credit work accepted in this class.

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.00007**)

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.00006**)

Attendance: Please refer to Attendance Policy (**Policy ID: OAA.00002**)

Conduct and Responsibilities: Please refer to the Personal Conduct, Responsibility and Academic Responsibility Policy (**Policy ID: OAA.00003**)

Make-up Exams: Please refer to Make-up Assessment Policy (**Policy ID: OAA.00001**)

Request for Special Testing: Please refer to Request for Special Testing (**Policy ID: OAA.00004**)

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.00005**)

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.00009**)

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 Deans Office. Contact info: Lpino@lifewest.edu or 510-780-4500 ext. 2061.

Course Goals:

Students are presented with a detailed study of the biomechanics of the spine. The functional significance of the spinal articulations, their effect on each other, on the appendicular skeleton, and on selected soft tissue structures. Spinal lesions and abnormal conditions are discussed to illustrate the importance of the normal functioning of the spine, and to illustrate some of the phenomena associated with spinal disorders including the biomechanical aspects of the vertebral subluxation complex. All presentations are made with respect to their relevance to the science, art and philosophy of chiropractic.

Course Objectives:

Course introduction. Review syllabus and course expectations.

Definitions and principles in spinal biomechanics.

Orthogonals, Cartesian Coordinate System and Movement.

Loads and Deformation.

Material properties of biological tissues.

Anatomy, function and biomechanics of the intervertebral disc (IVD)

Injury and degeneration of the IVD.

Biomechanics of bone (vertebrae), spinal ligaments and muscles.

Arthrokinematics

Review of cervical spine anatomy. Cervical spine kinematics.

Cervical spine trauma and instability. Biomechanics of whiplash.

Review of thoracic spine and rib cage anatomy.

Thoracic spine and ribcage kinematics. Biomechanics of scoliosis.

Review of lumbar spine anatomy. Lumbar spine kinematics.

Kinetics of lifting and biomechanics of core stabilization.

Spondylolisthesis.

Review of sacroiliac joints and pelvis. Kinematics of sacrum and pelvis.

Gait. Leg length inequality.

Biomechanics of the chiropractic adjustment.

Student Learning Outcomes (SLO):

- The student will better understand normal movements of the vertebral segments.
- The student will be able to describe normal and abnormal movements and joint positions including the use of the orthogonal system.
- The student will be better equipped to interpret Chiropractic listing systems.
- The student will build on past anatomy knowledge and get a firmer grasp of the functional anatomy of the spine.
- The student will understand and be able to articulate ideas such as springiness, stiffness, joint play and slack.
- The student will understand that normal biomechanical loading is necessary for spinal health.
- The student will appreciate that excessive loads or repetitive loads may cause damage to the spine.]
- The student will grasp basic arthrokinematics such as the convex/concave rule and

- start applying these principles in clinical courses.
- The student will have a better knowledge of common spinal conditions and how they are managed by Chiropractors.

The following PLO's are mapped to this course: [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.