

Division of Clinical Sciences
Department of Chiropractic Principles, Technique, and Biokinetics
Summer 2010 Syllabus

Course Title: Upper Extremity Biomechanics

Course Number: CH4220

Credit Hours: 2-lecture

Course Meeting Time and Location: Tuesday @ 10:00 (R206) and Friday @ 10:00 (R200)

Contact Information:

Course Instructor: Dr. Kimary L. Farrar, M.S., D.C., D.A.C.B.S.P.

Office: R216-Iwama Building

Office Hours: Wednesday 9:00-12:00 and 1:00-3:00, and Thursday 9:00-11:00

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<http://scholar360.com/txchiro>

Course Material

Required Text:

1. Kapanji, A. I., The Physiology of the Joints. The Upper Limb. Vol 1, 6th Ed., Churchill Livingstone Elsevier, 2007.
2. Whiting, W.C. & Zernicke, R.F., Biomechanics of Musculoskeletal Injury. Human Kinetics, 2008

Required Literature Reading: Articles are on reserve in the library.
(In order to be read)

Exam 1:

1. Hill, A.M., et al., *Qualitative and quantitative descriptions of glenohumeral motion*. Gait Posture, 2008. **27**(2): p. 177-88. (Read Sections 1,2,2.2, 3, 3.1)
2. Roy, J.S.,Moffet, H., Herbert, L., Vincent, G., and McFadyen, B., The reliability of three-dimensional scapular attitudes in healthy people and people with shoulder impingement syndrome., BMC Musc Disord, 2007. 8(49): Online.
3. Terrier, A., et al., *Effect of supraspinatus deficiency on humerus translation and glenohumeral contact force during abduction*. Clin Biomech (Bristol, Avon), 2007. **22**(6): p. 645-51.(skip Methods section)

Exam 2

4. Bryce, C.d. and A.D. Armstrong, *Anatomy and biomechanics of the elbow*. Orthop Clin North Am, 2008. **39**(2): p. 141-54, v.
5. Lockard, M., *Clinical biomechanics of the elbow*. J Hand Ther, 2006. **19**(2): p. 72-80
6. Kleinman, W.B., *Stability of the distal radioulna joint: biomechanics, pathophysiology, physical diagnosis, and restoration of function what we have learned ion 25 years*. J Hand Surg [Am], 2007. **32**(7): p. 1086-1097.
7. Meyer, K.E., et al., *Three-dimensional scapular kinematics during the throwing motion*. J Appl Biomech, 2008. **24**(1): p. (Intro, Results and Discussion)
8. Curl, D. D., et al., *The visual range of motion scale: analysis of Mandibular gait in a chiropractic setting*. JMPT, 1992. **15**(2): p. 115-22.

Exam 3

9. Gardner, M.J., J.J. Crisco, and S.W. Wolfe, *Carpal kinematics*. Hand Clin, 2006. **22**(4): p. 413-20; abstract
10. Moritomo, H., et al., 2007 IFSSH committee report of wrist biomechanics committee: biomechanics of the so-called dart-throwing motion of the wrist. J Han Surg [Am], 2007 **32**(9): p. 1447-53.
11. Baker, N.A. and E.L. Cidboy, *The effect of three alternative keyboard designs on forearm pronation, wrist extension, and ulnar deviation: a meta-analysis*. Am J Occup Ther, 2006. **60**(1): p. 40-9 (skip Methods and Data sections)

Additional Recommended Literature Reading:

1. Dun, S., et al., *Biomechanical comparison of the fastball from wind-up and the fastball from stretch in professional baseball pitchers*. Am J Sports Med, 2008. **36**(1): p. 137-41.
2. Kedgley, A.E., et al., *In vitro kinematics of the shoulder following rotator cuff injury*. Clin Biomech (Bristol, Avon), 2007. **22**(10): p. 1068-73.
3. Rempel, D.M., Keir, P.K., and Bach, J.M., *Effect of wrist posture on carpal tunnel pressure while typing*. J Orthop Res, 2008. **26**(9): p. 1269-73.

Course Description:

This course will provide a detailed analysis of the anatomy, normal biomechanics, and pathobiomechanics of the upper extremity and how they relate to common clinical problems. This course is designed to lay the foundation for the clinical mastery of orthopedics and rehabilitation.

CCE Competencies:

The council on Chiropractic Education has set competencies that are required for a graduate of any Doctor of Chiropractic Program. Competencies derived from this course are:

History Taking

Record Keeping

Chiropractic Adjusting

Neuromusculoskeletal Examination

Diagnosis

Case Management

TCC Competencies:

Evidence Based Practice/ Research

Physical Therapeutic Procedures

Learning Outcomes:

At conclusion of this course:

1. The student will be able to describe and differentiate normal from abnormal upper extremity biomechanics.
2. The student will be able to select and design an appropriate functional evaluation for a patient presenting with an upper extremity neuromusculoskeletal condition.
3. The student will be able to apply basic principles of kinematics and kinetics to the assessment of common disorders of the upper extremity.

Learning Objectives:

Attitude

The student must:

1. Discuss and justify biomechanics as the foundation of orthopedic testing, chiropractic manipulation, and physical medicine and rehabilitation.
2. Demonstrate effective communication skills in explaining normal and abnormal biomechanics.
3. Identify and accept the need for professional and ethical boundaries expected of the doctor/patient relationship.

Knowledge

The student must:

1. Define and describe the normal anatomy (muscles, ligaments, nerves, bony landmarks) of the upper extremity and TMJ.
2. Describe the normal biomechanics of the joints of the upper extremity and TMJ in relation to structure and function.

3. Formulate appropriate historical questioning about joint function in a patient with an upper extremity or TMJ problem.
4. Define and describe common abnormal altered biomechanics that may occur in some orthopedic conditions.
5. Analyze the possible causes for altered biomechanics in specific planes of motion.
6. Explain common kinetic and kinematic terminology and concepts related to joint motion.

Skills

The student must:

1. Perform portions of a functional evaluation of the joints of the upper extremity and TMJ.
2. Measure normal and abnormal findings pertaining to structure and function of the upper extremities and TMJ.

Teaching Philosophy:

The teaching philosophy of this course includes Socratic lectures based on power point presentations, research based assignments and class discussion. Discovery of learning will be utilized in order to empower the student in becoming a self motivated learner who is on their way to becoming a doctor of chiropractic. Reading assignments are to be completed prior to class so that discussion is that of higher learning. Clinical relevance will be introduced by showing the relationship of biomechanics to orthopedic examination, chiropractic adjusting, as well as musculoskeletal rehabilitation. I will do my best to present all material in an enjoyable, understandable, and informative atmosphere.

Student Responsibilities:

Students should:

1. Attend the entire class; be attentive and respectful of others. You are expected to contribute to class discussion and may lose points if you do not.
2. Take notes during the class. In class discussion will be a substantial part of the material tested.
3. Complete all reading assignments prior to class.
4. Turn in all assignments on time. Assignments are due at the start of class time. Late assignments will not be accepted.
5. Be prepared for all midterm and final exams.
6. Be responsible for completing the appropriate paperwork and meeting the appropriate deadlines should you withdraw from this course.
7. Not engage in any activity during class time that is not directly related to the days topic of discussion (i.e. surfing the net, e-mail, texting, cell phone usage...)

Course Content and Outline:

Week	Topic	Reading Assignment/Due Dates K = Kapanji W = Whiting
1	Intro/syllabus/ Shoulder	Pgs 1-39(K)
2	Shoulder	Pgs 40-75(K)
3	Shoulder/Case	Pgs 204-222(W)
4	Functional eval/ First Exam	
5	Elbow	Group article topic due; Pgs 76-89(K)
6	Elbow/ case	Pgs 90-145(K) 224-237(W)
7	Biomechanics/Sport Mechanics	53-92(W) 112-122(W)
8	Sports Mechanics	
9	Second Exam/ TMJ	
10	Wrist/No Class Friday	Pgs 146-270(K) 237-240(W)
11	Wrist/Hand	Pgs 271-340(K)
12	Hand/ Functional eval	
13	Student Presentations	
14-15	Review/FINAL	

Grading Method and Scale:

Evaluation:

First Examination 25%
(Multiple choice, fill-in, True-false, short answer)

Second Examination 30%
(Multiple choice, fill-in, True-false, short answer)

Final 25%
(Multiple choice, fill-in, True-false, short answer)

Power Point Presentation/articles 20%

Functional Evaluation (bonus opportunity) may or may not be offered

Grade Scale:

A = 90-100

B = 80-89

C = 70-79

F = below 70

Your final grade is your final grade. If you score an 89.5 you will get an “A” in the course. If you score an 89.2 you will get a “B” in the course. Please do not ask me if you can do extra credit to raise your score.

Essential Policy Information: “For specific procedures on how each policy is enforced see the Student Handbook.”

Attendance: Regular and punctual attendance at all scheduled classes is expected. A student is subject to academic penalty if absences exceed **ten percent**. Absences exceeding **twenty percent** subject a student to dismissal from the course. Three incidences of tardiness may constitute an absence.

This lecture course meets for 13 weeks (2 hours per week). One day is forfeited for a holiday and we meet one day for the final. The total amount of seat time is 26 hours. Over ten percent of this time would be three missed classes. Over twenty percent of this time would be 6 missed classes. **I will give you a “WF” if you miss 6 classes.**

Missed Examinations:

Students must notify faculty before missing any examination. If an examination is missed for good and sufficient reason and the student has notified the faculty member in advance, a make-up examination may be given subject to a fee of \$40.00. The fee for the make-up examination is a minimum of \$75.00 if a standardized patient is required for the exam. Additional required standardized patient hours may increase this \$75.00 minimum fee. All intra-term examination must be made up prior to final examinations. Missed final examinations must be made up within the first week of the next semester. A student may be allowed a maximum of two missed examination dates for good and sufficient reason per trimester. These two missed examination dates are for all enrolled courses in a trimester, not for each individual course. Any request for additional make-up examinations will require documentation substantiating the absence and must be approved by the Dean of Academic Affairs.

All make-up examinations will be short answer/essay. You have 2 weeks from the date you return to make up exams missed during the trimester.

Students arriving late for written examinations will not be allowed extra time. Students arriving late after an examinee has turned in their test will not be allowed to take the written examination and must schedule an appointment for a make-up provided they have appropriate acceptable documentation as to why they were late.

Incompletes: Course assignments and examinations must be completed prior to the final examination in that course. Those not completed will receive a grade of zero.

Cellular phones/Electronic Devices: Electronic communication devices are to be turned off or placed in silent mode when in the classroom. These devices are **NOT**

allowed to be on your person during testing situations. Cellular phones may **NOT** be answered during class time without prior permission from the faculty member. Texting or e-mailing is **NOT** allowed during class time. All devices will be confiscated if used during class and the student will lose 5% of their final total grade per offense. There is **NO** warning on this issue. Refusal to turn over your electronic device constitutes “insubordination” and an incident report will be filed.

Inappropriate Behavior Causing Class Distraction:

I find it extremely distracting if I see a student “smirking” or laughing or talking during my lecture. This means that I can not be the best I can be for the students that are there to learn. If someone else is more interesting than I am feel free to leave because if it occurs you will be asked to leave and not return until you can exhibit professional decorum and an incident report will be elicited.

Guidance and Counseling: The Guidance and Counseling Department is prepared to confidentially assist you with personal, relationship or academic issues. With appropriate documentation, the Director of Guidance and Counseling coordinates academic related special needs with instructors.

Plagiarism: “Plagiarism is defined as copying or paraphrasing information from any published or non-published source, except for properly referenced citation, and presenting this material as one’s own, original work for credit in a course. Plagiarism is considered the equivalent of cheating.” **I will give you a “WF” if you are given an individual assignment and you do it with someone else.**

Disclaimer: This syllabus is a living document. The faculty reserves the right to reasonably alter the sequence of activities, evaluations, and assignment dates. Every effort will be made to inform the class with sufficient notice. Students are responsible for following the syllabus and any change instituted by the faculty.