

Division of Academic Affairs for Technique, Principles & Therapeutics
Department of Chiropractic Technique and Biokinetics
Spring 2012 Syllabus

Course Title: Upper Extremity Biomechanics

Course Number: CH4220

Credit Hours: 2-lecture

Course Meeting Time and Location: Tuesday @ 3:00 (R-200) and Thursday @ 1:00 (I-104)

Contact Information:

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

Office: 216-Iwama Building

Office Hours: Tuesday 11:00-2:00, Wednesday 10:00-12:00, Thursday 10:00-11:00 and 12:00-1:00

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<http://edvance360.com/txchiro>

Course Material

Required Text:

1. Bergmann, T.F. & Peterson, D.H., Chiropractic Technique Principles and Procedures. 3rd Ed., Elsevier Mosby 2011.
2. Kapanji, A. I., The Physiology of the Joints. The Upper Limb. Vol 1, 6th Ed., Churchill Livingstone Elsevier, 2007.

Recommended Text:

1. Panjabi, M.M., & White, A.A. (2001) Biomechanics in the Musculoskeletal System New York: Churchill Livingstone.
2. Whiting, W.C. & Zernicke, R.F., Biomechanics of Musculoskeletal Injury. Human Kinetics, 2008

Required Literature Reading: Articles are on Edvance 360.

(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)

Exam 3

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

Prerequisite: Spinal Biomechanics, Gross Anatomy & Embryology I

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 and TMJ biomechanics.
2. The student will be able determine appropriate mechanisms of injury of common upper extremity or TMJ musculoskeletal conditions.
3. The student will be able to apply basic principles of kinematics and kinetics to the assessment of common disorders of the upper extremity.
4. The student will be able to explain rationale in determining appropriate upper extremity and TMJ adjusting based on joint biomechanics.

Learning Objectives:

The student must:

1. 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. Define and describe the normal anatomy (muscles, ligaments, nerves, boney landmarks) of the upper extremity and TMJ.
4. Describe the relevant upper extremity anatomy involved in musculoskeletal injuries.
5. Describe the normal biomechanics of the joints of the upper extremity and TMJ in relation to structure and function.
6. Analyze the possible causes for altered biomechanics in specific planes of motion.

7. Define and describe common abnormal altered biomechanics that may occur in some orthopedic conditions.
8. Analyze sport specific injuries of the upper extremity and TMJ joint.
9. Perform portions of a functional evaluation of the joints of the upper extremity and TMJ.
10. Evaluate normal and abnormal findings pertaining to structure and function of the upper extremities and TMJ.
11. Explain the concepts of joint mechanics, including range of motion, joint stability, lever systems, and joint reaction force.
12. Explain common kinetic and kinematic terminology and concepts related to joint motion.
13. Explain concepts of material mechanics to include stress, strain, and tissue failure.
14. Explain rationale for determining specific line of drives for correction of restrictions based upon visual inspection, range of motion of the joint, location of pain, and specific diagnosis.

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. If you leave class early you will be marked either tardy or absent. You are expected to contribute to class discussion and participate in skills when asked or you may lose points.
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 B=Bergmann W = Whiting
1	Intro, syllabus, Shoulder	Pgs 1-29(K)
2	Shoulder	Pgs 30-45(K) , 294-302 (B)
3	Shoulder	Pgs 46-75 (K) and pgs 47,204-224(W)
4	Case/ First Exam	
5	Biomechanics	Pgs 75-78 and 112-118(W)
6	Elbow	Pgs 76-103(K), 316-321 (B)
7	Elbow/ case	Pgs 104-145(K) pgs 48, 224-237(W)
8	Sports Mechanics	
9	Second Exam/ TMJ	283-290 (B)
10	Wrist	Pgs 146-197(K) and pgs 48, 237-240(W), 326-333 (B)
11	Hand	Pgs 198-340(K)
12	Upper Extremity Adjusting Concepts	Chapter 6 (B) pgs 294-337
13	Student Presentations	
14-15	FINAL	

Grading Method and Scale:

Evaluation:

First Examination (Multiple choice, fill-in, True-false, short answer)	25%
Second Examination (Multiple choice, fill-in, True-false, short answer)	25%
Final (Multiple choice, fill-in, True-false, short answer extended matching)	30%
Power Point Presentation/articles (see posted rubric)	20%

Final 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.

You have 2 weeks to review your test from the day the grade is posted. After that you may not review your test.

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 will constitute an absence.

This lecture course meets for 15 weeks (2 hours per week). The total amount of seat time is 30 hours. **Over ten percent** of this time would be **4 missed classes**. Over twenty percent of this time would be 7 missed classes. **I will give you a “WF” if you miss 7 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.

Faculty Classroom Management Policy:

TCC is committed to the fundamental principles of freedom of speech, including controversial positions taken in the classroom by faculty and/or students.

However, all types of speech and behavior must be balanced with principles of appropriate classroom behavior in a professional school. Faculty have a right to establish clear expectations in this regard and students should share the responsibility for maintaining an appropriate, orderly learning environment.

Students who fail to adhere to the behavioral expectations outlined by the instructor (either in the syllabus or at the time the behavior occurs) may be subject to discipline in accordance with the procedures described below and the College's Student Discipline Policy (see Student Handbook).

Identification of disruptive behavior by students may include but is not limited to:

Mild to moderately disruptive behavior;

Persistent speaking without permission

Engaging in activities not related to the class

Inappropriate use of computers, cell phones or other electronic devices

Sleeping in class

Chronically entering class late or leaving early

Eating or drinking in the classroom if the faculty members syllabus specifically disallows it

Disputing authority in an argumentative or disrespectful manner with faculty and/or other students

Moderate to severely disruptive behavior;

Verbal or physical threats

Physical altercations

Destruction of property

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 10% 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.

You may only use your lap top for taking notes and following along with Dr. Farrar’s power point. Should you have any other screen up you will lose the privilege of using a lap top in ALL class you have now or will have in the future with Dr. Farrar. This will be considered unprofessional conduct and you will lose 10% of your final grade.

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. I will give you a “WF” if you cut and paste material from anywhere (internet, other professor’s slides) and turn it in as your own work. All turned in work is to be a summary of material in your own words whether it is referenced or not.**

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.