Texas A&M University-Corpus Christi

College of Education

KINE 4327.002 - Biomechanics

Course Number and Section: KINE 4327
Instructor: Kelly Brooks, Ph.D.
Class Meeting Time and Location: TR 2-3:15pm, IH 263
Office: IH 357
Fall 2013
Phone #: 361-825-2670
Office Hours: TWR 12-2
email: Kelly.Brooks@tamucc.edu

I. COURSE DESCRIPTION
An analysis of the mechanical factors and principles influencing human motion with emphasis on sport and fitness activities. Prerequisite: BIOL 2401 and KINE 4325. KINE 4327 must be taken concurrently with KINE 4127.

II. RATIONALE
The course provides students with a fundamental knowledge of biomechanics and its practical application to the qualitative and quantitative analysis of human motion.

III. STATE ADOPTED PROFICIENCIES FOR TEACHERS AND/OR ADMINISTRATORS/COUNSELORS

1. LEARNER-CENTERED KNOWLEDGE: The teacher possesses and draws on a rich knowledge base of content, pedagogy, and technology to provide relevant and meaningful learning experiences for all students.

2. LEARNER-CENTERED INSTRUCTION: To create a learner-centered community, the teacher collaboratively identifies needs; and plans, implements, and assesses instruction using technology and other resources.

3. EQUITY IN EXCELLENCE FOR ALL LEARNERS: The teacher responds appropriately to diverse groups of learners.

4. LEARNER-CENTERED COMMUNICATION: While acting as an advocate for all students and the school, the teacher demonstrates effective professional and interpersonal communication skills.

5. LEARNER-CENTERED PROFESSIONAL DEVELOPMENT: The teacher, as a reflective practitioner dedicated to all students’ success, demonstrates a commitment to learn, to improve the profession, and to maintain ethics and personal integrity.

IV. TExES COMPETENCIES & CAATE COMPETENCIES & PROFICIENCIES

a. TExES COMPETENCIES
Domain II - HEALTH-RELATED PHYSICAL FITNESS
Competency 006 - The teacher understands major body systems, principles of physical fitness development and training, and the benefits of a healthy, active lifestyle.
Domain III - THE PHYSICAL EDUCATION PROGRAM

Competency 011 - The teacher understands factors relevant to learning and performance in physical education and uses this knowledge to create learning environments and opportunities that promote students' development in various domains (e.g., cognitive, social, emotional).

Competency 012 - The teacher understands the structure, organization, goals, and purposes of physical education programs.

b. NATIONAL COMPETENCIES & PROFICIENCIES FOR ATHLETIC TRAINING
(CAATE 4th Ed.)

Diagnosis Competencies Taught & Evaluated

- **DI-C4**: Explain directional terms and cardinal planes used to describe the body and the relationship of its parts.

V. COURSE OBJECTIVES AND LEARNING OUTCOMES

As a result of successfully completing this course, the student will be able to:

1. Distinguish between quantitative and qualitative approaches for analyzing human movement.
2. Identify examples of linear, angular, and general forms of human motion.
3. Identify different types of mechanical loads on the human body.
4. Explain the effects of Newton's laws of motion and gravitation on human motion.
5. Explain the factors which affect friction in human motion.
6. Explain the impulse-momentum relationship.
7. Explain the significance of center of gravity location in the human body.
8. Explain how fluid forces affect the path or trajectory of a body in motion.
9. Explain the planes of motion and types of human levers.
10. Identify the major muscles and muscle groups of the human body, and relate muscle/joint function to physical education and sport activities.
11. Apply basic principles of biomechanics to fundamental sports skills and movement patterns.
12. Analyze selected movement patterns and sport skills.
13. Identify and explain equipment and techniques used in the analysis of human movement.
14. Identify and correct movement deficiencies of a structural, neurological, or mechanical nature.
VI. COURSE TOPICS

1. Introduction to the study of biomechanics.
2. Qualitative analysis.
3. Instrumentation.
4. Basic biomechanical concepts.
5. Linear kinematics.
7. Angular kinematics.
8. Angular kinetics.
10. Application to movement activities.

VII. INSTRUCTIONAL METHODS AND ACTIVITIES

A. Traditional Experiences: lecture, discussions, instructor demonstrations, video, student presentations.
B. Lab Experiences: video capture, Dartfish software.

VIII. EVALUATION AND GRADE ASSIGNMENTS

COURSE REQUIREMENTS

1. Successful completion of quizzes and written exams.
2. Complete all written assignments.
3. Complete all laboratory assignments and maintain a notebook of lab results and experiences.
4. Complete a biomechanical analysis of selected human movement or sport skill.
5. Demonstrate computer proficiency in Dartfish motion analysis software.
6. **NOTE:** Late assignments will not be accepted. All written work must exhibit a college level competency in spelling, grammar, punctuation, and style. Written work with significant mechanical flaws will not be accepted.

EVALUATION

1. Tests (3) 100 pts. ea. 50%
2. Quizzes (10) 10%
3. Motion Analysis Project 20%
4. Written Assignments 10%
5. Labs 10%
IX. COURSE SCHEDULE AND POLICIES

Topic

1. Introduction to the study of biomechanics.

2. Review of the body/planes of motion; Muscle Review

3. Qualitative analysis vs Quantitative analysis

4. Instrumentation.

5. Test I

6. Basic biomechanical concepts.

7. Basic biomechanical concepts.

8. Linear kinematics.

9. Linear kinetics.

10. Test II

11. Angular kinematics.

12. Angular kinetics/fluid dynamics

13. Fluid dynamics of human movement/Application to movement activities

14. Motion Analysis Presentations
ATTENDANCE POLICY
Students are required to punctually attend all class meetings (when applicable) and complete all assignment deadlines. Excused absences are limited to participation in a TAMUCC sanctioned event or participation in a religious holy day as outlined in the University catalog. Any assignment, quiz, or test missed due to a TAMUCC sanctioned event must be completed prior to the absence. Coursework, assignments, and quizzes may not be made up due to tardiness.

Consistent attention to assignment instructions and submission deadlines is critical to the successful completion of this course.

STUDENT CONDUCT
Professional behavior is expected of all students. Inappropriate course conduct may result in a reduced final grade or failure of the course.

NOTE: Please be aware that no food or drink (including water) is allowed in the lab. Please leave all food or drink outside of the classroom.

NOTE: Printing online tests and/or quizzes is strictly prohibited.

X. TEXTBOOK (required)

XI. BIBLIOGRAPHY
XII. **GRADE APPEALS**

As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Academic Honesty**

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, forgery, or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.)

Disciplinary action for academic misconduct is the responsibility of the faculty member assigned to the course. The faculty member is charged with assessing the gravity of any case of academic dishonesty, and with giving sanction to any student involved. Penalties that may be applied to individual cases of academic dishonesty include one or more of the following:

1. Written reprimand;
2. Requirement to re-do work in question;
3. Requirement to submit additional work;
4. Lowering of grade on work in question;
5. Assigning grade of “F” to work in question;
6. Assigning grade of “F” for course;
7. Recommendation for more severe punishment.
If the faculty member determines that assigning a grade of “F” to the course is the appropriate penalty and this disciplinary action occurs prior to the deadline for dropping courses, the student forfeits his/her right to drop the course in question.

The faculty member may file a record of cases of academic dishonesty, including a description of the disciplinary action taken, along with any materials involved, with his or her college dean and the Office of Student Affairs. The office of the academic dean of the college in which the offense took place will maintain records of all cases of academic dishonesty reported for a period of not more than two years.

Any student who has been penalized for academic dishonesty has the right to appeal the judgment or the penalty assessed (See XII above).

**XIII. DISABILITIES ACCOMMODATIONS**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in CCH 116. If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

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**KINE 4327-Biomechanics/Lab Syllabus Acknowledgment Form**

I, (print name)____________________________________________, certify by my signature that I have read and understand the class policies that have been presented in the class syllabus for KINE 4327-Biomechanics at Texas A&M University-Corpus Christi.

Signature ________________________________ Date ____________________