**McMASTER UNIVERSITY Life Sciences**

**LIFE SCIENCE 3J03 BIOMECHANICS \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**COURSE OUTLINE 2016**

**COURSE OBJECTIVES:**

To apply the principles of mechanics to human movement, to gain an understanding of the tissue properties and to apply this knowledge to solving problems involving human motion.

**MARKING SCHEME:** Midterm Exam #1 ..................………25%

Midterm Exam #2 ….................…... 25%

Final Examination ..…..........…....… 50%

**REQUIRED MATERIAL:** A hand-held calculator that has all of the basic mathematical functions as well as the trigonometric functions and their inverses.

**LECTURE TOPICS:**

- Goals and Objectives of Biomechanists

- Trigonometry and Vector Addition

- Rectangular Components of Vectors

- Moment of Force (Torque)

- Levers

- Static Equilibrium, Joint Reaction Forces, Shear and Conpression

- Pulleys and Gears

- Friction

- Linear Kinematics

-Fluid Mechanics

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-Angular Kinematics

-Moment of Inertia

-Projectile Motion

-Anthropometry

- Pendulum Technique and Living Subject Methods

- Dynamic Equilibrium

- 3-D Forces and Kinematics

- 3-D Moments and Vector Multiplication

- Introduction to Mechanical Energy and Work

- Muscle Power and Energy Transfer

- Impulse and Momentum

- Drag and Cycling Mechanics

- Projectiles with Air Resistance

- Electromyography

- Muscle Mechanics

- Muscle Architecture

- Stress and Strain of Bone

- Articular Cartilage

**FEEDBACK**

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

**MODIFICATIONS TO COURSE**

* Plagiarism (e.g. the submission of work that is not one's own or for which other credit has been obtained),
* Improper collaboration in group work.
* Copying or using unauthorized aids in tests and examinations.

The following illustrates only three forms of academic dishonesty:

http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences (e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript reading "Grade of F assigned for academic dishonesty", and/or suspension or expulsion from the university). It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at:

**ACADEMIC INTEGRITY**

Students who miss a Registrar-scheduled final exam can apply to the Associate Dean’s office for permission to write in the deferred final exam schedule. In all cases, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science, for consideration of deferred examination permission. Under no circumstances will the instructor re-schedule a final exam for individual students.

Students who miss the final exam for legitimate reasons such as illness may be allowed to write a deferred or "make-up" test. Students who miss the mid-term exam will receive an estimated mark based on the Z-score of their final exam mark. In all instances, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science.

**POLICY REGARDING DEFERRED TESTS AND EXAMS**

It really helps us improve our services when we hear from our students, faculty and staff about what we can do better. A feedback process brings to our attention situations in which we may not have adequately considered accessibility and allows us to better plan for accessibility in the future.