

**McMASTER UNIVERSITY**

**Kinesiology 4AA3  
APPLIED BIOMECHANICS**

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**COURSE OUTLINE 2018**

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**COURSE OBJECTIVES:**

To build upon the principles learned in Life Science 3J03 and to gain an understanding of applied topics in the biomechanics of human motion by:

- 1) Learning how to review the literature of current topics facing the modern biomechanist.
- 2) Applying self-directed learning towards the biomechanical solution of human movement problems.

**MARKING SCHEME:**

Midterm Exam .....25%  
Consultant Report ..... 40%  
Final Examination ..... 35%

**REQUIRED MATERIAL:** A hand-held calculator that has all of the basic mathematical functions as well as the trigonometric functions and their inverses. **CALCULATORS WILL NOT BE ALLOWED IN EXAMINATIONS.**

**LECTURE TOPICS:**

- Introduction
- Orthopaedic Biomechanics
- Occupational Biomechanics (History and Pre-employment Screening)
- Occupational Biomechanics (Lifting Models, NIOSH, and Risk Factors)
- Overuse Injuries (Carpal Tunnel Syndrome)
- Biomechanics of Resistance Exercise and Equipment Design
- Exercise Specificity
- Closed Chain versus Open Chain exercises (Knee Rehabilitation)
- Biomechanical Considerations for Prosthetics and Orthotics
- Head Injury and Helmet Design and Testing
- Forensic Biomechanics
- Functional Electrical Stimulation of Muscle
- Instantaneous Power and Human Performance

- Are Humans Able to Voluntarily Elicit Maximum Muscle Force?
- Disability Sport Biomechanics
- Sport Engineering
- Detection of Malingering

### **POLICY REGARDING DEFERRED TESTS AND EXAMS**

Students who miss the term test or final exam for legitimate reasons such as illness may be allowed to write a deferred or "make-up" test. The midterm exam will be estimated with a Z-score and the final exam must be written as a deferred exam (see below). In all instances, appropriate documentation must be submitted to the Office of the Associate Dean, Faculty of Science.

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.

### **ACADEMIC INTEGRITY**

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:

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

The following illustrates only three forms of academic dishonesty:

- 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.

### **MODIFICATIONS TO COURSE**

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.

### **FEEDBACK**

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.