

**McMaster University**  
**Department of Kinesiology**  
**Kinesiology 4GG3 - CLINICAL BIOMECHANICS**  
**Winter 2018**

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**INSTRUCTOR:** Peter J. Keir, PhD  
IWC 212, Ext. 23543, email: pjkeir@mcmaster.ca

**OFFICE HOURS:** Drop in & by appointment

**LECTURES:** Tuesday 11:30 – 1:20 IWC 224

**LAB:** Wednesday 2:30 – 4:20 IWC A102G

**TEACHING ASSISTANT:** Daanish Mulla

**COURSE WEBPAGE:** Avenue to Learn

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**COURSE OBJECTIVES:**

This course offers an introduction to some of the issues in clinical biomechanics, including:

- Further develop their understanding of biomechanics through clinical applications
- Material properties as they apply to biological and implant materials
- Application to injury and rehabilitation mechanisms
- An introduction to normal and clinical gait analysis
- Evaluation and presentation of current research

**PREREQUISITE:** KIN 2A03

**LECTURE NOTES & READINGS: Avenue to Learn:**

Other materials will be posted on Avenue to Learn throughout the semester. This may include practice problems with solutions, documents with selected slides for upcoming lectures, resource materials, advance lab handouts. Students are advised to check Avenue to Learn the day before each class, lab or exam, for materials that may be needed or relevant for that class, lab or exam.

**GRADING**

1. Participation/Discussion involvement	=	10	%
2. Journal Paper Review			
a) Group Paper Presentation (Jan. 24)	=	5	%
b) Individual Review – 2 page max (due Jan. 31)	=	5	%
3. Research Proposal (with literature review) (due April 9)	=	30	%
a) Class Presentation (Mar. 28, Apr. 3-4; ~15 min + Q&A)	=	15	%
4. Final Exam (Scheduled by registrar)	=	35	%

**Returning Graded Work**

Graded work will be returned or available for review during normally scheduled lecture and/or laboratory time and students who are not available to pick up their work, must contact the instructor or designated TA to make individual arrangements. Any appeal for grade revision must be (a) received within 7 days of the return of the work to the class, (b) explicitly stated in writing why you believe the mark is in error. Note that any resubmitted material may be re-graded in its entirety. An appealed grade may increase, decrease, or remain unchanged.

### **Research Proposal with Literature Review (30% of term grade plus 15% for presentation)**

Each student will choose an area of clinical biomechanics and write a research proposal that includes a detailed review of the pertinent literature in that area. Topics must be biomechanically oriented with clinical relevance and must be cleared with the course director. Paper may include figures but is limited to 15 double spaced pages not including a full reference list.

Example topics (not limited to): Prosthetics; Artificial joints & limbs; Clinical gait analysis (cerebral palsy, surgical interventions, amputees); Tissue repair (ligaments, tendons); Tissue response to surgical plates, pins; various disorders and motion related diseases/conditions, etc.

### **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. 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.

### **McMASTER STUDENT ABSENCE FORM**

If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, without documentation, using the McMaster Student Absence Form (as long as the missed work is worth less than 25% of the final course grade). The MSAF can only be used once per term. Absences for a longer duration or for other reasons (eg. religious, personal) must be reported to the Faculty of Science Associate Dean's office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to [pjkeir@mcmaster.ca](mailto:pjkeir@mcmaster.ca). Contact the instructor immediately (normally within 2 working days) by email/telephone/in person to learn what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam.

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work". Please note these regulations have changed beginning Fall 2015.

### **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. 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

### **ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES**

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone (905) 525-9140 ext. 28652 or email [sas@mcmaster.ca](mailto:sas@mcmaster.ca). For further information, consult McMaster University's Policy of Academic Accommodation of Students with Disabilities. <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

### **ON-LINE LEARNING RESOURCES**

Students should be aware that, when they access the electronic components of this course, private

information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

### **USE OF COURSE MATERIAL**

Course materials provided by the instructor are for use by students registered in this class only. Under no circumstances are these materials to be shared, posted or sold to a third party without permission from the instructor. This includes, but not limited to, online posting of instructor provided lecture/lab notes, online lectures, recordings of lectures, or any lab materials on a website other than the Avenue site designed for this course.

### **TURNITIN.COM**

In this course we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity)

### **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 helps us improve our services when we hear from our students 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.

## KIN 4GG3: Clinical Biomechanics

Winter 2018

### Tentative Topical Outline & Assignments

Updated December 13, 2017

<b>Class</b>	<b>#</b>	<b>Topic</b>	<b>Assignment</b>
T Jan. 9	1	Introduction & Biomechanics Review	Orthopaedic Basic Science, Ch. 5. p.134-143
W Jan. 10	L1	<i>Reviewing lit + A/D</i>	<b>Paper</b> - Gunning et al. (2001) Spine strength- Clin Biomech 16:471-480
T Jan. 16	2	EMG	
W Jan. 17	L2	<i>LAB EMG</i>	
T Jan. 23	3	Gait Analysis – Intro/ Normal	Whittle (1996) Clinical Gait Analysis Hum.Mov.Sci.15:369-387.
W Jan. 24	L3	<b>Group Paper reviews</b>	
T Jan. 30	4	Gait Analysis – Abnormal	
W Jan. 31	L4	<i>EMG and Force collection</i>	<b>Hand in</b> – 2 page student paper critique (each group member submits individual review)
T Feb. 6	5	Gait Wrap up	
W Feb. 7	L5	<i>LAB – Gait Analysis</i>	
T Feb. 13	6	Carpal Tunnel Syndrome & nerve trauma	CTS review plus other papers on AVenue
W Feb. 14	L6	<i>Gait Analysis Case studies</i>	
Feb. 19-23		<i>No Class</i>	<i>Reading Week</i>
T Feb. 27	7	Muscle & Tissue Mechanics	Orthopaedic Basic Science, Ch. 5. p.148-166 (tissue mechanics)
W Feb. 28	L7	<i>Gait Lab Analysis/Discussion</i>	
T Mar. 6	8	Imaging in Biomechanics	
W Mar. 7	L8	<i>Ultrasound Lab</i>	
T Mar. 13	9	Shoulder Mechanics & Injury	Guest Lecture
W Mar. 14	L9		
T Mar. 20	10	Joints – Friction & wear; Tissue Mechanics	Orthopaedic Basic Science, Ch. 5. p.168-177 (Joints & tribology)
W Mar. 21	L10	<i>Preparation for Presentations</i>	
T Mar. 27	11	Case studies	Biceps tendon rupture
W Mar. 28	L11	<i>Presentations</i>	
T Apr. 3	12	Presentations	
W Apr. 4	L12	<i>Presentations</i>	
M April 9			<b>Research Proposal due April 6.</b>
Apr. 11-26		<b>FINAL EXAM</b>	Scheduled by Registrar's Office