

**KIN 4520B - Clinical Biomechanics
 Winter 2023**

<p>Instructor: Dr. Jim Dickey Office: TH 4175 Email: jdickey@uwo.ca Phone: 519/661-2111 x87834 Office Hrs: by appointment</p> <p>TAs: Pardis Baha pbaha2@uwo.ca Kathryn Schulze kschulze@uwo.ca Wayne Allison walliso2@uwo.ca</p>	<p>Lectures (AHB 3B02): Tu 10:30AM-12:30PM Th 10:30AM-11:30AM</p> <p>Labs (TH 2111) 002 Tu 4:30PM-6:30PM 003 We 12:30PM-2:30PM 004 We 2:30PM-4:30PM</p>
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NOTE: All course information including grades, assignment outlines, deadlines, etc. are available via OWL. Check the website regularly for course announcements.

Calendar Course Description (including prerequisites/anti-requisites):

This course is designed to explore the theoretical basis of clinical biomechanics and develop hands-on skills necessary to work in the area. Special emphasis will be in the areas of: Posture and Balance, Gait, and Orthopaedic Biomechanics.

Antirequisite(s): [Kinesiology 4450A/B](#), [Kinesiology 4475A/B](#).

Prerequisite(s): One of [Kinesiology 3341A/B](#), [Kinesiology 3343A/B](#) or [Kinesiology 3353A/B](#).

Extra Information: 3 lecture hours, 2 laboratory hours

You are responsible for ensuring that you have successfully completed all course pre-requisites, and that you have not taken an anti-requisite course.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

NOTE: If you wish to enroll in this course without the stated pre-requisite(s), you must obtain written approval from the course instructor. The approval should then be forwarded to your academic counsellor.

My Course Description

This course will assist students in developing an understanding of how biomechanics can be applied in a clinical context, specifically considering the regulation of standing balance, gait and orthopaedics. This course will be delivered in lectures and labs. The small-group research project provides an opportunity for hands-on learning and results in a paper that can be submitted for publication.

WHY SHOULD YOU TAKE THIS COURSE?:

- THIS COURSE PROVIDES HANDS-ON EXPERIENCE THAT IS DIRECTLY RELEVANT IF YOU ARE THINKING OF A CAREER IN PHYSIOTHERAPY, OCCUPATIONAL THERAPY, MEDICINE, CHIROPRACTIC MEDICINE OR NURSING.
- THE COURSE FOCUSES ON APPLYING BIOMECHANICAL CONCEPTS RATHER THAN MATHEMATICAL DERIVATIONS AND NUMERICAL PROBLEMS, MAKING THE CLASS MATERIAL VERY ACCESSIBLE

PREVIOUS STUDENTS SAY:

- “I really enjoyed taking your clinical biomechanics course last year, and I've found myself applying and observing many of the concepts in my daily life. I found the content to be incredibly fascinating. JB 2019”
- “Just a quick physio school update. We are currently doing a block on biomechanics, and I thought you'd like to know that your clinical biomechanics course is extremely applicable to what we are learning, and has given me a great foundation to build off of! SFM 2018”
- “the knowledge you have provided me with has been extremely helpful in terms of my academic career, but also as lessons I can carry with me throughout my entire life. The 4th year Clinical Biomechanics class has been a huge part of my application allowing me to draw on my own experience doing independent research and pursuing a publication beyond that. So I also want to thank you for being such a significant professor during my undergrad. Your enthusiasm to teach has really amplified my eagerness to learn. PL 2018”

Learning Outcomes:

The students will learn the theoretical underpinnings of Clinical Biomechanics through discussion of Posture and Balance, Gait, and Orthopaedic Biomechanics. The students will be exposed to different biomechanical measurements and analyses in the laboratory components of the course. The students will gain hands-on experience in the small-group research project component of the course.

Upon completion of this course students will be able to:

1. **Identify and delineate** theoretical terms, concepts, and fundamental principles related to specific topics within Clinical Biomechanics such as Posture and Balance, Gait, and Orthopaedic Biomechanics (Knowledge)
2. **Compare and contrast** different theoretical approaches to specific topics within Clinical Biomechanics, such as standing balance and risk of falling. (Analysis)
3. **Develop** hands-on research skills through the small-group research project (Application)
4. **Further develop** abilities to *critically reflect* upon own learning and relate to the topics discussed in class. (Reflection)

Required Course Material:

All required readings and lecture notes will be posted on OWL.

Course Evaluation Summary: (this is an example)

1.	Labs	10%
2.	Small-Group research project Introduction and Methods (Midnight Feb 10, Pending approval)	5%
3.	Small-Group research project written report	15%
4.	Small-Group research project presentation and abstract	5%
5.	Mid Term (Feb 28 ^h in class, Pending approval)	25%
6.	Final Exam	40%

Course Evaluation Details:

1. Labs will be announced in class and on OWL. The labs will involve evaluation and interpretation of data, such as force plate data during standing balance, and kinematics and kinetics during gait. The laboratory evaluations are based on quizzes completed after the lab activities are complete.

The time slots for the labs will be used for other “face-to-face” encounters to support the course, such as assistance with the small-group research projects and “office hours”.

Assignments are due as stated in the course syllabus and will not be accepted late, except under medical or other compassionate circumstances. Submitting a late assignment without appropriate documentation will result in a zero (0) grade. A missed midterm examination or laboratory, without appropriate documentation will result in a zero (0) grade. Acceptable reasons might include hospital stays, serious illness, family emergencies (like serious accidents, illness or death) or similar circumstances. In the case of missed midterm examinations with approved formal academic considerations, the make-up examination will occur during class, one week after the regularly scheduled midterm. In the case of approved formal academic considerations but continuing medical or compassionate circumstances such that it is not possible to perform the scheduled make-up examination, then the marking scheme will be reweighted to put the emphasis on the final exam. In the case of missed laboratories, the student should attend a different lab section for the same lab. If a student is unable to attend a different lab section for the same lab, and has approved formal academic considerations, then the other labs will be re-weighted to make up the lab grade.

2. Small-Group research projects:

These projects involve replicating a published research study. Suggested topics include balance or gait, as the background for these topics will be covered in class in the first part of the term. The purpose of these projects is to provide a hands-on laboratory experience tailored to the interests of the group. Students will pick groups of 4 or 5 class members, ideally from the same lab section. These groups must pick a research study to replicate that must be 1) based within Clinical Biomechanics, 2) must involve collecting and analyzing data, and 3) must use available equipment and software (i.e. force plate). Within each lab section, each project must be unique (based on a different published research study), and must be pre-approved by Dr. Dickey.

The steps include picking a group and approval of the published research article, organizing hardware and software requirements, writing the introduction and methods, starting data collection, starting analyzing the data, writing the final report. A draft copy of the introduction and methods sections, including proper citations and references, must be submitted to enable feedback. Deliverables at the end of the project include an abstract (including the purpose of the study and the main results), final report, and the group will present their project in class. The final report is in the form of a complete manuscript based on the data collected for the group project. The final project must be handed in as both paper and electronic (matching) versions. While your paper may be similar to the article that you are replicating, it should also include additional current pertinent references, and the discussion should be tailored to your particular project, data and interests.

Part of the evaluation will be based on grades ascribed by group consensus. The midterm evaluation must include a detailed summary of the group’s progress. This process is intended to ensure that the project is on track, that there is an even distribution of effort among the group members, and that adequate timely feedback is provided to all group members.

The final reports will be graded based on content, clarity and professionalism.

The project should be written up for submission to The Western Undergraduate Research Journal: Health and Natural Sciences (WURJHNS). Information about the formatting requirements is available at <https://ojs.lib.uwo.ca/index.php/wurjhns>. Please consider using bibliographic citation management software such as Zotero (<https://elearningtoolkit.uwo.ca/tools/Zotero.html>).

Please consider the differences between essays and scientific writing --- you are writing a scientific paper, not an essay (Wagner PD. Writing Up Your Research Results for Publication. Chest 2009;136:639-642).

Students must write all aspects of the paper in their own words. You must acknowledge ideas that you take from others using proper referencing. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All papers will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism.

Several projects from previous years have been successfully published in WURJ-HNS:

Nielson C, Deegan E, Hung A, Nunes A (2010) Potential Effects of Sleep Deprivation on Sensorimotor Integration during Quiet Stance in Young Adults. WURJ Health and Natural Sciences 1: Article 5.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/4920/4596>

Delgado G, Coghlin C, Earle K, Holec A, O'Hare K (2011) Trunk extensor muscle fatigue does not affect postural control during upright static stance in young-adults and middle-aged adults. WURJ: Health and Natural Sciences 2: Paper 2.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/4929/4074>

Grey T, Redguard R, Wengle R, Wegscheider P (2013) Effect of Plantar Flexor Muscle Fatigue on Postural Control. Western Undergraduate Research Journal Health and Natural Sciences 4: 1-7.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/4965/4110>

Baker C M and Barkwell G E (2017) Regulation of Balance After Spinning: A Comparison Between Figure Skaters and Controls, WURJ: Health and Natural Sciences, 7: Article 5.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/5088/4233>

Cogswell F. D., Huang F, and Dietze B (2017) The Effects of Upper-Body and Lower-Body Fatigue on Standing Balance, WURJ: Health and Natural Sciences, 7: Article 12.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/5109/4254>

Cohen J W, Lee P, and Buchman-Pearle J. (2017) The Effects of Footwear on Squat Movements, WURJ: Health and Natural Sciences, 8: Article 30.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/5211/4356>

Smith W J, Richards D J, Zhou S H, Kennedy T. (2017) The Effect of Plantar Flexor Fatigue and Cognitive Recall Task on Standing Balance, WURJ: Health and Natural Sciences, 8: Article 14.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/5163/4308>

Goddard E C, Remler P T, Roos R H, Turchyn R. (2018) The Effect of Texting on Balance and Temporospatial Aspects of Gait, WURJ: Health and Natural Sciences, 9: Article 3.

<https://ojs.lib.uwo.ca/index.php/wurjhns/article/view/6108/4899>

3. The small-group project's abstract and presentation will be graded based on their content, clarity and professionalism.

4. The midterm covers material covered in classes and labs to that point in the term. It will be comprised of multiple choice, numeric response, short-answer questions and interpretations.

5. The final exam is cumulative, covering material covered in classes and labs from the entire term. It will be comprised of multiple choice, numeric response, short-answer questions and interpretations.

Course/University Policies

1. The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with [policy](#), the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

2. Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the [Academic Calendar \(westerncalendar.uwo.ca\)](#).

Plagiarism

Student work is expected to be original. Plagiarism is a serious academic offence and could lead to a zero on the assignment in question, a zero in this course, or your expulsion from the university. You are plagiarizing if you insert a phrase, sentence or paragraph taken directly from another author without acknowledging that the work belongs to him/her. Similarly, you are plagiarizing if you paraphrase or summarize another author's ideas without acknowledging that the ideas belong to someone else. All papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com (www.turnitin.com).

Re-submission of Previously Graded Material

Without the explicit written permission of the instructor, you may not submit any academic work for which credit has been obtained previously, or for which credit is being sought, in another course or program of study in the University or elsewhere.

Use of Statistical Pattern Recognition on Multiple Choice Exams

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

3. Use of Electronic Devices

During Exams: Unless you have medical accommodations that require you to do so, or explicit permission from the instructor of the course, you may not use any electronic devices during ANY tests, quizzes, midterms, examinations, or other in-class evaluations.

During Lectures and Tutorials: Although you are welcome to use a computer during lecture and tutorial periods, you are expected to use the computer for scholastic purposes only, and refrain from engaging in any activities that may

distract other students from learning. From time to time, your professor may ask the class to turn off all computers, to facilitate learning or discussion of the material presented in a particular class. **Unless explicitly noted otherwise, you may not make audio or video recordings of lectures – nor may you edit, re-use, distribute, or re-broadcast any of the material posted to the course website.**

Personal Response Systems (“clickers”) may be used in some classes. For those classes in which we use this technology, it is your responsibility to ensure that the device is activated and functional. You must speak with the course instructor immediately, if you have any concerns about whether or not your clicker is malfunctioning.

You must use only your own clicker. For all components of this course in which clicker records are used to compute a portion of the grade:

- The use of somebody else’s clicker in class constitutes a scholastic offence;
- The possession of a clicker belonging to another student will be interpreted as an attempt to commit a scholastic offense

4. **Academic Considerations and Absences from Lectures and Assessments**

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request (in writing) any necessary academic considerations at least two weeks prior to the holiday to the academic counsellors in their Home Department. Additional information is provided in the [Western Multicultural Calendar](#).

Academic Accommodation

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. Students with ongoing accommodation needs within this course are also encouraged to contact [Accessible Education](#), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found [here](#).

Academic Consideration

The University recognizes that a student’s ability to meet their academic responsibilities may, on occasion, be impaired by extenuating circumstances that are medical or compassionate in nature. These extenuating circumstances may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. In all cases, students are advised to consult with the academic counsellors in their home units, at their earliest opportunity. Academic counsellors may refer students to [Accessible Education](#) for ongoing academic accommodations.

Most forms of academic consideration require documentation, and this documentation is to be submitted to academic counsellors within five (5) business days of their return to academic responsibilities. Any such documents will be retained in the student's file, and will be held in confidence in accordance with the University's [Official Student Record Information Privacy Policy](#). Once the petition and supporting documents have been received and assessed, appropriate academic considerations shall be determined by academic counseling, in consultation with the student's instructor(s). Academic considerations may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, arranging Special Exams or Incompletes, re-weighting course requirements, or granting late withdrawals without academic penalty. Academic considerations shall be granted only where the documentation indicates that the onset, duration and severity of the illness are such that the student could not reasonably be expected to complete their academic responsibilities. (Note – it will not be sufficient to provide documentation indicating simply that the student “was seen for a medical reason” or “was ill.”).

Whenever possible, students who require academic considerations should provide notification and documentation in advance of due dates, examinations, etc. Under no circumstances are students expected to submit rationales for (or documentation of) any absences, to course instructors. Students are, however, required to follow-up with course instructors, in a timely fashion, to identify the ways in which the academic consideration will be implemented.

Examination Conflicts

A student completing tests or examinations with flexible submission times (e.g., where one or more evaluation is a take-home assessment) cannot request alternative arrangements unless a conflict cannot be avoided by rescheduling writing the exam to a different time within the window specified by the instructor. This applies to direct conflicts as well as “heavy load” conflicts (e.g., three exams within a 23-hour period). The student should discuss any concerns about a potential conflict and/or request academic considerations with their academic counselling unit prior to the deadline to drop a course without academic penalty.

In the case of online tests and examinations, use of a “Conflict Room,” wherein student can write two proctored exams concurrently, will be interpreted as arrangements for continuous proctoring.

5. Contingency Plan for an In-Person Class Pivoting to 100% Online Learning

In the event of a situation that requires this course to pivot to online content delivery, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor

Note that disruptive behaviour of any type during online classes, including inappropriate use of the chat function, is unacceptable. Students found guilty of Zoom-bombing a class or of other serious online offenses may be subject to disciplinary measures under the Code of Student Conduct.

6. Online Proctoring

Tests and examinations in this course may be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

7. Grades

Where possible assignment objectives and rubrics will be posted on OWL.

Generally, students can expect some form of feedback on their performance in a course before the drop date.

- November 12th, 2022 (for first term half-courses)
- November 30th, 2022 (for full-year courses)
- March 7th, 2023 (for second term half-or full year courses)

A+	90-100	<i>One could scarcely expect better from a student at this level</i>
A	80-89	<i>Superior work that is clearly above average</i>
B	70-79	<i>Good work, meeting all requirements and eminently satisfactory</i>
C	60-69	<i>Competent work, meeting requirements</i>
D	50-59	<i>Fair work, minimally acceptable.</i>
F	below 50	<i>Fail</i>

Rounding of Grades (for example, bumping a 79 to 80%):

This is a practice some students request. The final grade documented is the grade that you have achieved. There is no rounding to the next grade level, or 'giving away' of marks. Please don't ask me to do this for you; the response will be "please review the course outline where this is presented".

Appealing a Grade Within this Course

You have the right to appeal any grade within this course. The grounds for a grade appeal may be one or more of: medical or compassionate circumstances, extenuating circumstances beyond the student's control, bias, inaccuracy, or unfairness. All grounds advanced in a request for relief must be supported by a clear and detailed explanation of the reasons for the request together with all supporting documentation.

Appeals generally proceed in this order:

1. Course instructor (informal consultation)
2. Department Chair (submission of written request)
3. The Dean of the Faculty (submission of written request)

In the case of perceived procedural unfairness, steps 2 and 3 are carried out within the Department and Faculty offering the course. In the case of extenuating

medical or compassionate circumstances that impact on a grade, steps 2 and 3 are carried out within a student's Home Department and Faculty.

A request for relief against a mark or grade must be initiated with the instructor as soon as possible after the mark is issued. In the event that the instructor is not available to the student, or fails to act, or if the matter is not resolved satisfactorily with the instructor, a written request for relief must be submitted to the Chair of the Department within three weeks of the date that the mark was issued. In the case of a final grade in a course, the written request for relief must be submitted to the Chair of the department by January 31st (for first-term half courses) or June 30th (for second-term half courses or full-year courses)

8. Support Services

Health and Wellness:

Information regarding health and wellness-related services available to students may be found at <http://www.health.uwo.ca/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/>) for a complete list of options about how to obtain help.

There are various support services around campus and these include, but are not limited to:
Student Development Centre -- <http://www.sdc.uwo.ca/ssd/>
Ombudsperson Office -- <http://www.uwo.ca/ombuds/>

9. Student Code of Conduct

The purpose of the Code of Student Conduct is to define the general standard of conduct expected of students registered at Western University, provide examples of behaviour that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed and set out the disciplinary procedures that the University will follow. For more information, visit <https://www.uwo.ca/univsec/pdf/board/code.pdf>