



HK*3600 Applied Human Kinetics I

Fall 2022

Section(s): C01

Department of Human Health and Nutritional Sciences

Credit Weight: 0.75

Version 1.00 - September 02, 2022

1 Course Details

1.1 Calendar Description

This course covers laboratory techniques which are central to human biology, together with their underlying concepts. Human performance and function are evaluated through cellular, organic, systemic and whole person studies. The student's technical competence and conceptual understanding are emphasized.

Pre-Requisites: HK*2270
Co-Requisites: HK*3810
Restrictions: Registration in the Human Kinetics major.

1.2 Course Description

The objective of this course is to introduce the student to laboratory measures that examine the functioning of a human body at rest and in motion. The students will be introduced to the underlying concepts of various physiological and neuromechanical measures in lecture. The principles from lecture will then be used to make direct respiratory, cardiovascular, metabolic, thermoregulatory, neuromuscular, sensorimotor, kinetic and kinematic measures in the laboratory. Students will be asked to describe the laboratory measures and findings, and to integrate the lecture and laboratory material in formalized laboratory reports. The information and technical expertise gained in this course will provide the foundation for future and more advanced courses (i.e. HK 4600 Applied Human Kinetics II and others) that explore human biology in the Human Kinetics Major.

1.3 Timetable

Lecture: Classes will be held in-person Monday, Wednesday, Friday - 1:30-2:20 PM (ROZH 102).

Laboratories: Labs are in-person in JT Powell Building (Rooms 2236 & 2237).

Section 0101: Tuesday - 10:00 PM - 12:50 PM

Section 0102: Tuesday - 2:30 PM - 5:20 PM

Section 0103: Wednesday - 2:30 PM - 5:20 PM

Section 0104: Thursday - 10:00 AM - 12:50 PM

1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Chris Pignanelli
Email: cpignane@uoguelph.ca
Office: HHNS Annex 271
Office Hours: Office hours by appointment (please email or see instructor after class).

Instructor: Dennis Larson
Email: larsond@uoguelph.ca
Office: ANNU 358
Office Hours: Office hours by appointment (please email or see instructor after class)

2.2 Teaching Assistants

To arrange an appointment with your TA, please email or speak with them in lab.

Physiology:

Christian Cheung - Head TA for physiology (ccheun05@uoguelph.ca)

Rachel Handy (rhandy@uoguelph.ca)

Kyle Thompson (kthomp20@uoguelph.ca)

Katherine Athaide (kathaide@uoguelph.ca)

Emma Hubbard (ehubbard@uoguelph.ca)

Biomechanics:

Brye McMorran: bmcmorra@uoguelph.ca

Keaton Briar: kbriar@uoguelph.ca

Avery Hinks: ahinks@uoguelph.ca

Daniel Genaro Juarrero: dgenaroj@uoguelph.ca

Lab Technician:

Chris Norman, cnorm@uoguelph.ca

3 Learning Resources

3.1 Recommended Resources

Exercise Physiology: Theory and application to fitness and performance (Textbook)

Physiology portion of the course (First 6 weeks): Powers SK, and ET Howley. Exercise Physiology: Theory and application to fitness and performance. 7th , 8th, 9th, or 10th Edition. McGraw-Hill, Toronto, 2009, 2012, 2015, 2018.

Neuromechanics of Human Movement (Textbook)

Biomechanics portion of the course (Last 6 weeks): Enoka R. Neuromechanics of Human Movement. 4th or 5th Edition, Human Kinetics, 2008, 2015.

3.2 Additional Resources

LabChart Reader (Software)

<https://www.adinstruments.com/products/labchart-reader>

Some labs use LabChart software for data collection. If desired, students may download the "LabChart Reader" on their own computers to view the data that was collected in-lab.

This may be helpful to become more familiar with how to navigate the software prior to or after each lab.

You may also be able to perform some data extraction and calculations with the reader; however, the bulk of data extraction and calculations will need to be performed in-lab due to the premium software being required.

3.3 Reference Texts - Physiology

1. Hale T. Exercise Physiology: A Thematic Approach. Wiley, 2003.
2. McArdle, FI Katch, and VL Katch. Exercise Physiology: Energy, Nutr, & Human Perf. LWW, 2010.
3. Guyton AC. Textbook of Medical Physiology. 10th Ed. WB Saunders Co. 2001.
4. Vander AJ, JH Sherman and DS Luciano. Human Physiology: The Mechanisms of Body Function. 7th Edition, McGraw-Hill, 1998.

3.3 Reference Texts - Biomechanics

1. Hamill J, Knutzen KM. Biomechanical Basis of Human Movement. 4th Edition. LWW, 2015.
2. Kandel ER, JH Schwartz, and TM Jessell. Principals of Neural Science. 4th Edition, McGraw-Hill, 2000.
3. Roberston DGE et al. Research Methods in Biomechanics. Human Kinetics, 2004.
4. Winter DA. Biomechanics & Motor Control of Human Movement. Wiley, 2005. 5. Kaman G, Gabriel DA. Essentials of Electromyography. Human Kinetics, 2010

3.3 Campus Resources

If you are concerned about any aspect of your academic program: make an appointment with a Program Counsellor in your degree program.

If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.

If you are struggling with personal or health issues: Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. Student Health Services is located on campus and is available to provide medical attention. For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions

related to stress management and high performance situations.

If you have a documented disability or think you may have a disability: Student Accessibility Services (SAS) formerly Centre for Students with Disabilities can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability.

4 Learning Outcomes

Course Learning Objectives

1. Develop your understanding and working knowledge of key techniques used in human physiology and biomechanics testing and evaluation
2. Develop and enhance your ability to work effectively as part of a group
3. Enhance learning and problem solving through group work and group discussion of course material
4. Be able to integrate lecture and lab material within lab reports and exams
5. Learn how to analyze data sets and to critically evaluate lab-generated data
6. Develop scientific writing skills
7. This course will prepare you for the following courses: HK* 4600 [0.75] Applied Human Kinetics II; HK*4070 [0.50] Clinical Biomechanics; HK*4240 [0.75] Occupational Biomechanics and Ergonomics; HK*4460 [0.50] Regulation of Human Metabolism; HK*4550 [0.75] Human Cardio-respiratory Physiology; HK*4610 [0.50] Health and Injury Biomechanics.

5 Teaching and Learning Activities

5.1 Lecture

Fri, Sep 9 - Fri, Oct 21

Topics: Lecture and Lab Schedule 1st HALF including DUE DATES.

Note - Lecture topic dates are only estimated and are subjected to change.

Week	Date	Lecture Topic	Chapters	Lab
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Week 0	9-Sep	Introduction to the course and exercise physiology	1	-
Week 1	12-Sep	Lab material introduction		Lab 1 - Introduction to physiological measurements in human kinetics
	14-Sep	Respiration, blood gas transport, and cardiovascular responses to exercise		
	16-Sep		1, 9, 10	
Week 2	19-Sep	Basic cardiovascular responses to exercise, intro to energy metabolism		
	21-Sep	Energy metabolism		Lab 2 - Respiratory and cardiovascular responses to exercise *LAB REPORT*
	23-Sep		1, 3, 4, 9, 10	
Week 3	26-Sep	Advanced cardiovascular responses to exercise and maximal aerobic exercise		Lab 3 - Measurement of submaximal $\dot{V}O_2$, energy expenditure and substrate use during exercise
	28-Sep		1, 4, 9, 13, 15,	
	30-Sep		20	*LAB 2 REPORT DUE
Week 4	3-Oct	Oxygen debt and deficit, anaerobic energy contribution		
	5-Oct		4, 9, 13,	Lab 4 - Maximal oxygen uptake ($\dot{V}O_2$ max) Testing *LAB REPORT*
	7-Oct		15, 20	
Week 5	10-Oct	No Class	-	
	12-Oct		11, 12,	Lab 5 - Estimation of

		Special topics in physiology	21, 24, 25	anaerobic energy contribution, power and capacity during exercise *LAB 4 REPORT DUE
	14-Oct			
Week 6	17-Oct			
	19-Oct	Exam review		
	21-Oct	Midterm Exam	-	

Mon, Oct 24 - Fri, Dec 2

Topics: Lecture and Lab Schedule 2nd HALF including DUE DATES

Note - Lecture topic dates are only estimated and are subjected to change.

Week 7	24-Oct	Electromyography (EMG): Learn how to measure muscle activity and understand	5, 6	-
	26-Oct	EMG-force and fatigue relationship		
	28-Oct			
Week 8	31-Oct	The nervous system: What is the H-reflex? Learn how the H-reflex can help us	7	LAB 6 - EMG lab
	2-Nov	understand the spinal cord and how sensory information alters movement		*LAB REPORT*
	4-Nov			
Week 9	7-Nov	Kinetics: What is force? Learn force measurement, force plate techniques	2	LAB 7 - H-reflex lab
	9-Nov			*LAB 6 REPORT DUE*

	11-Nov			
Week 10	14-Nov	Kinematics: understanding 2D data collection, velocity, and acceleration	1	LAB 8 - Kinetics: force measurement
	16-Nov	calculations		*LAB REPORT*
	18-Nov			
Week 11	21-Nov	Human movement & balance	-	LAB 9 - Kinematics: video-based analysis, velocity, and acceleration
	23-Nov			
	25-Nov			*LAB 8 REPORT DUE*
Week 12	28-Nov	Review of class material & clarification of concepts	-	-
	30-Nov			
	2-Dec			

Final Exam - December 13, 2022

5.2 Physiology Labs - explanation for lab 5 make-up

Due to the Fall Study break, the laboratory sections on **Tuesday, October 11th** will not be performing lab 5. Instead, the students are expected to conduct lab 5 the following week (Tuesday, October 18th) at the usual time.

5.3 Biomechanics Labs - explanation for lab splitting

LAB # 6 (Oct 31 - Nov 4) - EMG

Tuesday 10:00 AM - 12:50 PM: All Lab groups

Tuesday 2:30 PM - 5:20 PM: All Lab groups

Wednesday 2:30 PM - 5:20 PM: All Lab groups

Thursday 10:00 AM - 12:50 PM: All Lab groups

LAB # 7 (Nov 7 - Nov 11) - H REFLEX

Tuesday 10:00 AM - 12:50 PM: All Lab groups

Tuesday 2:30 PM - 5:20 PM: All Lab groups

Wednesday 2:30 PM - 5:20 PM: All Lab groups

Thursday 10:00 AM - 12:50 PM: All Lab groups

LAB # 8 (Nov 14 - Nov 18) - KINETICS**EACH LAB GROUP IS SPLIT INTO 2 TIME SLOTS FOR ATTENDANCE.**

Tuesday 10:00 AM – Lab groups 1-4; 11:30 AM – Lab groups 5-8

Tuesday 2:30 PM – Lab groups 1-4; 4:00 PM – Lab groups 5-8

Wednesday 2:30 PM - Lab groups 1-4; 4:00 PM - Lab groups 5-8

Thursday 10:00 AM – Lab groups 1-4; 11:30 AM – Lab groups 5-8

There will be 2 stations in room 2237 set up for force plate measurements (Kinetics lab). The group will split in half and work at one of the two stations.

LAB # 9 (Nov 21 - Nov 25) - KINEMATICS

Tuesday 10:00 AM - 12:50 PM: All Lab groups

Tuesday 2:30 PM - 5:20 PM: All Lab groups

Wednesday 2:30 PM - 5:20 PM: All Lab groups

Thursday 10:00 AM - 12:50 PM: All Lab groups

6 Assessments

6.1 Marking Schemes & Distributions

Lab reports - Learning outcomes 1-6

Exams - Learning outcomes 1,4,5

Name	Scheme A (%)
Lab Reports	60
Midterm #1	20
Midterm #2	20
Total	100

6.2 Assessment Details

Lab Reports (60%)

4 lab reports X 15% - Lab reports are due the following week at the beginning of your lab section. Late lab reports without a valid documented reason are penalized 10% per day up to 5 days, after which the lab is marked as zero.

LABs #2, #4, #6 and #8 are mandatory to hand in. These are handed in at the beginning of lab time, ONE WEEK following the lab.

Midterm #1 (20%)

Date: Fri, Oct 21, 1:30 PM - 2:20 PM

The midterm exam will be conducted in-person at the same location as the lectures. The exam will be 50 minutes in-length comprised of mostly multiple choice with several short-answer questions. Questions will be derived from lecture and lab material. It is recommended you bring a calculator to the exam in the event that calculation-based questions are asked.

Midterm #2 (20%)

Date: Tue, Dec 13, 8:30 AM - 10:30 AM

1.5 Hours

7 Course Statements

7.1 Human Ethics

Ethical approval has been obtained from the Research Ethics Board at the University of Guelph for subject participation in the course laboratories. Please refer to the University of Guelph ethics website for further information

<http://www.uoguelph.ca/research/humanParticipants/PDF/policies/1%20-%20Review%20Policies/1-G-008.pdf>

If you have any concerns about the ethics of this course program, please contact the University of Guelph ethics officer, Telephone: (519) 824-4120, ext. 56606, E-mail: reb@uoguelph.ca, Fax: (519) 821-5236.

7.2 Course Teaching/Learning Approach

The course comprises a combination of lectures, applied labs and tutorials. You will perform a series of 9 labs. The emphasis of the course is on applied techniques that are relevant to those of you considering applied or research careers in human biomechanics, performance and clinical exercise testing, ergonomics, occupational therapy, exercise physiology, physiotherapy, kinesiologists, sports injury rehabilitation, paramedics, medicine, chiropractics, etc. The general skills you obtain will also provide you with the ability to work in groups and successfully troubleshoot challenges in other work environments.

The key concepts and theory underlying each lab will be presented in a series of lectures, such that this material is presented to you in the week preceding the lab. The lecture and lab material will be posted on D2L.

The lectures start on Friday, Sept 9th, 2021.

The labs begin during the week of Sept 12th (Tuesday - Thursday)

7.3 Use of Respondus for Assessments

Currently, the entire course is planned to be in-person.

In the event that there is a requirement to transition to online examining, the course will plan to use Respondus Lockdown software for some assessments. Your instructors are aware that some students have expressed concerns about the use of this exam invigilation software. The University Administration has approved the use of Respondus Lockdown software and other online monitoring platforms that use artificial intelligence for remote invigilation. Your instructors are committed to an equitable and accessible assessment experience, please contact your instructor if you have concerns.

8 Department of Human Health and Nutritional Sciences Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.selfregulationskills.ca/>

8.4 Personal information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) <http://www.e-laws.gov.on.ca/index.html>. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes.

For more information regarding the Collection, Use and Disclosure of Personal Information

policies please see the Undergraduate Calendar.
 (<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

9.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

9.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

9.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>

- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
