



# HK\*3600 Applied Human Kinetics I - DRAFT

Fall 2018  
Section(s): C01

College of Biological Science  
Credit Weight: 0.75  
Version 1.00 - May 17, 2018

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## 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-Requisite(s):** HK\*2270  
**Co-Requisite(s):** HK\*3810 or HK\*3940  
**Restriction(s):** 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

**Classes:** MACN 113 M, W, F - 1:30-2:20 PM

**Laboratories:** JT Powell Building - rooms 208 A & B

Lab 1: Tuesday – 10:00 PM – 12:50 PM

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

No lab 3 listed on web advisor

Lab 4: Wednesday - 2:30 PM - 5:20 PM

Lab 5: Thursday – 10:00 AM – 12:50 PM

Lab 6: Thursday – 2:30 PM – 5:20 PM

## 1.4 Final Exam

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

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## 2 Instructional Support

### 2.1 Instructor(s)

**Jamie Burr**

**Email:** burrj@uoguelph.ca  
**Telephone:** +1-519-824-4120 x52591  
**Office:** GFTC 263

**Leah Bent**

**Email:** lbent@uoguelph.ca  
**Telephone:** +1-519-824-4120 x56442  
**Office:** ANNU 331

### 2.2 Teaching Assistants

**Physiology:**

TBD

**Biomechanics:**

TBD

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## 3 Learning Resources

### 3.1 Recommended Resource(s)

**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. 7 th , 8 th , or 9th Edition. McGraw-Hill, Toronto, 2009, 2012, 2015.

**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.

**CoursePack (Other)**

**FOR BIOMECHANICS HALF:** There is a coursepack for the course which are combined readings from two different text books. This is available in the bookstore

## 3.2 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.

## 3.2 Reference Texts - Biomechanics

1. Hamill J, Knutzen KM. Biomechanical Basis of Human Movement. 3rd Edition. LWW, 2009.
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.

## 3.2 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.

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## 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

Mon, Sep 10 - Fri, Oct 19

Topic(s):

Lecture and Lab Schedule 1st HALF including DUE DATES

<u>Month</u>	<u>Date</u>	<u>Lecture Topic</u>	<u>Lab</u>	<u>Chapters</u>
	September 7th	Introduction		-
Week 1	10	Intro to exercise physiology and energy metabolism—producing energy to move and stay alive	Introduction to physiological measures in human kinetics	<b>Chapters 1, 12, 24</b>
	12			
	14			
Week 2	17	Respiratory and cardiovascular responses to exercise	LAB 2 – Respiratory and cardiovascular responses to exercise <b>LAB REPORT REQUIRED</b>	<b>Chapters 9, 10</b>
	19			
	21			
Week 3	24	Measuring oxygen uptake (VO <sub>2</sub> ) and energy expenditure in human kinetics	LAB 3 – Measurement of submaximal VO <sub>2</sub> <i>(LAB 2 REPORT DUE AT BEGINNING OF LAB TIME)</i>	<b>Chapters 1, 4, 15</b>
	26			
	28			
Week 4	October 1st	Oxygen uptake continued and maximal aerobic exercise	LAB 4 – Maximal oxygen uptake testing (VO <sub>2</sub> max)	<b>Chapter 13, 20</b>

**LAB REPORT REQUIRED**

	3			
	5			
	8	No Class		
Week 5	10	Importance of anaerobic energy contribution during varying forms of exercise	LAB 5– Estimation of anaerobic energy contribution, power and capacity during exercise <i>(LAB 4 REPORT DUE AT BEGINNING OF LAB TIME)</i>	<b>Chapter 11, 19</b>
	12	No Class		
	15			<b>Chapter 25</b>
Week 6	17	Finish material/ return Lab 4	LAB 5 - make up dates - See lab 5 instructions regarding Tues/Thursday re-scheduling	
	19	Midterm Exam		
<b>Mon, Oct 22 - Fri, Nov 30</b>				
<b>Topic(s):</b>		Lecture and Lab Schedule 2nd HALF including DUE DATES		
		<b><u>Enoka</u></b>		
<b><u>Month</u></b>	<b><u>Date</u></b>	<b><u>Lecture Topic</u></b>	<b><u>Lab</u></b>	<b><u>Chapters 5<sup>th</sup> edition</u></b>
	22	Introduction to electromyography (EMG).		<b>Chapters 5 and 6</b>
Week 7	24	Learn how to measure muscle activity and understand EMG-force and fatigue relationship		
	26			
	29	The nervous system. What is the H-reflex? Learn how the H-	LAB 6 - EMG lab	<b>Chapter 7</b>
Week 8	31	reflex can help us understand the spinal cord and how sensory information alters movement?	<b>LAB REPORT REQUIRED</b>	
	November 2			
Week 9	5	Kinetics, What is force? Learn force measurement, Force plate techniques	LAB 7- H-reflex lab	<b>Chapter 2</b>
	7		<i>(LAB 6 REPORT DUE AT BEGINNING OF</i>	

	9		LAB TIME)	
	12			<b>Chapter 1</b>
Week 10	14	Kinematics – understanding 2D data collection, velocity and acceleration calculations	LAB -8 Kinetics, Force measurement	<b>and TBD</b>
	16		<b>REPORT REQUIRED</b>	
	19		LAB -9 Kinematics- video based analysis	<b>Page 296,</b>
Week 11	21	The vestibular system and the motor cortex. Learn about our inner ear and balance. Understand the role our brain plays in the generation of movement	–velocity and acceleration <i>(LAB 8 DUE AT BEGINNING OF LAB TIME)</i>	<b>333, 334</b>
	23			
	26		Transcranial Magnetic Stimulation (TMS) and Galvanic Vestibular Stimulation (GVS) Demo in class	<b>296, 309-310</b>
Week 12	28	Review of class material –clarification of concepts		
	30	Review		

## 5.2 Physiology Labs - explanation for lab splitting

**LAB # 3 - 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**

**Wednesday 10:30 AM – Lab groups 1-4: Noon – 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**

**Thursday 2:30 PM - Lab groups 1-4: 4:00 PM - Lab groups 5-8**

There will be 3 stations (A, B & C) in Room 208 A where oxygen uptake (VO<sub>2</sub>) will be measured.

There will be ~12-16 students in each of the above groups and you will be further divided into 3 sub-groups; A, B, and C. We will need a volunteer who is willing to do exercise at each of the stations – so we need 3 subjects in total at each of the 10 time slots.

**LAB # 4 - EACH LAB GROUP IS SPLIT INTO 2 TIME SLOTS FOR ATTENDANCE**

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

**Wednesday 10:30 AM – Lab groups 5-8: noon – Lab groups 1-4**

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

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

**Thursday 2:30 PM - Lab groups 5-8: 4:00 PM - Lab groups 1-4**

There will be 3 stations (A, B & C) in Room 208A where oxygen uptake and body composition will be measured.

There will be ~12-16 students in each of the above groups and you will work in the same 3 sub-groups (A, B, and C) as in lab # 3. We will need a volunteer who is willing to do exercise all the way up to VO<sub>2</sub>max and voluntary exhaustion at each of the stations – the subject will also have their body composition measured – so we need 3 subjects in total at each of the 10 time slots.

### **LAB # 5 EACH LAB GROUP SPLIT INTO 2 TIME SLOTS FOR ATTENDANCE**

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

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

**Wednesday 10:30 AM - Lab Groups 1-4: Noon - Lab Groups 5-8**

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

**Thursday Group (normally 10am) – rescheduled to Monday 17th 7:00 PM – Lab groups 1-4: 8:30 PM – Lab groups 5-8**

**Thursday Group (normally 2:30) – rescheduled to Tuesday 18th 7:00PM – Lab groups 1-4: 8:30 PM – Lab groups 5-8**

There will be 3 stations (A, B & C) in Room 208A where oxygen uptake will be measured. There will be one station (Wingate) where the sprint tests are done for all three groups.

There will be ~12-16 students in each of the above groups and you will work in the same 3 sub-groups (A, B, and C) as in labs 3 & 4. We will need a volunteer who is willing to do the two sub-maximal exercise rides and one additional volunteer to do the all-out sprint or Wingate test. So we need 2 volunteers in each of lab group A, B & C in each of the 10 time slots.

## **5.3 Biomechanics Labs - explanation for lab splitting**

**LAB # 6 (OCT 29-Nov2) EMG**

**Tuesday 10:00 AM -1:00All Lab groups**

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

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

**Thursday 10:00 AM – 1:00 All Lab groups**

**Thursday 2:30 PM – 5:30 All Lab groups**

**LAB # 7 (Nov 5 - Nov 9) - H REFLEX**

**Tuesday 10:00 AM -1:00 All Lab groups**

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

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

**Thursday 10:00 AM – 1:00 All Lab groups**

**Thursday 2:30 PM – 5:30 All Lab groups**

**LAB # 8 (NOV 12 - NOV 16) - 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 AM – 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**

**Thursday 2:30 PM – Lab groups 1-4: 4:00 PM – Lab groups 5-8**

There will be 2 stations in room 208B set up for force plate measurements (Kinetics lab). The group will split in half and work at one of the two stations.

We will need one or two volunteers for the Galvanic Vestibular Stimulation (GVS) demo in class during week 11.

**LAB # 9 (NOV 19- NOV 23) KINEMATICS**

**Tuesday 10:00 AM -1:00 All Lab groups**

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

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

**Thursday 10:00 AM – 1:00 All Lab groups**

**Thursday 2:30 PM – 5:30 All Lab groups**

**FINAL EXAM – TBD**

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## **6 Assessments**



## 6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Lab Reports	60.00
Midterm #1	20.00
Midterm #2	20.00
Total	100.00

## 6.2 Assessment Details

### Lab Reports (60.00%)

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 an #8 are mandatory to hand in. These are handed in at the beginning of lab time, ONE WEEK following the lab.**

### Midterm #1 (20.00%)

50 Minutes

### Midterm #2 (20.00%)

1.5 Hours

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## 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, Sandy Auld, Telephone: (519) 824-4120, ext. 56606, E-mail: sauld@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 10 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, kinesiology, 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, 2016.**

**The labs begin during the week of Sept 12-16th, 2016 (Tuesday - Thursday Sept. 13-15th)**

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## 8 College of Biological Science 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.
- 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: [Chemistry & Physics Help](#) and [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.
  - [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](#).
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## 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 regulations and procedures for [Academic Consideration](#) are detailed in the Undergraduate Calendar.

## 9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Undergraduate Calendar.

## 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 book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

## 9.6 Academic Misconduct

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 discourages misconduct. 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.

The [Academic Misconduct Policy](#) is detailed in the Undergraduate Calendar.

## 9.7 Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate 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 which apply to undergraduate, graduate and diploma programs.

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