

Western University
Faculty of Health Sciences
School of Kinesiology

**KIN 3337A - Physiology of Fitness Appraisal
Fall 2019**

<p>Instructor: Dr. Glen Belfry Office: Arts & Humanities Bldg Rm 3G24 Email: gbelfry@uwo.ca Phone: 519/661-2111 x88364 Office Hours: by appointment</p> <p><u>LABS</u> Instructor: Michael Herbert Office: Arts & Humanities Bldg Rm 3G04 Email: mherber5@uwo.ca Phone: 519/661-2111 x88675 Office Hrs: Will be posted at beginning of semester</p> <p>TAs: TBD</p>	<p>Lectures: Mo 9:30am - 10:30am We 9:30am - 10:30 am</p> <p>Room: Spencer Engineering Bldg Rm 2100</p> <p>Lab</p> <table> <tr><td>002</td><td>Mo</td><td>11:30am - 1:30pm</td><td>~AHB 1R43</td></tr> <tr><td>003</td><td>Tu</td><td>12:30pm - 2:30pm</td><td>~AHB 1R43</td></tr> <tr><td>004</td><td>Tu</td><td>2:30pm - 4:30pm</td><td>~AHB 1R43</td></tr> <tr><td>005</td><td>Th</td><td>12:30pm - 2:30pm</td><td>~AHB 1R43</td></tr> <tr><td>006</td><td>Th</td><td>2:30pm - 4:30pm</td><td>~AHB 1R43</td></tr> <tr><td>007</td><td>Fr</td><td>8:30am - 10:30am</td><td>~AHB 1R43</td></tr> <tr><td>008</td><td>Fr</td><td>10:30am - 12:30pm</td><td>~AHB 1R43</td></tr> </table>	002	Mo	11:30am - 1:30pm	~AHB 1R43	003	Tu	12:30pm - 2:30pm	~AHB 1R43	004	Tu	2:30pm - 4:30pm	~AHB 1R43	005	Th	12:30pm - 2:30pm	~AHB 1R43	006	Th	2:30pm - 4:30pm	~AHB 1R43	007	Fr	8:30am - 10:30am	~AHB 1R43	008	Fr	10:30am - 12:30pm	~AHB 1R43
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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):

The scientific basis of physical fitness appraisal; the construction and the effective administration of physical fitness tests, including motor fitness, cardiovascular endurance fitness and body composition; individual fitness appraisal.

Prerequisite(s): [Kinesiology 2230A/B](#).

Extra Information: 2-3 lecture/tutorial hours, 2 laboratory hours. Priority to BSc(Hons) Kinesiology students.

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 enrol 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.

Learning Outcomes/Schedule:

Lecture outline:

Physiology of Fitness Appraisal

Chapter 1

I. **A. Measuring Gas Exchange to Evaluate Cardiovascular Function and Cellular Respiration.**

Maximal Oxygen Consumption (VO_2 Max)

B. Coupling

Steady State: $VO_2 = CO_2$

C. Physical Activity is the Major Challenge to Homeostasis of the Cellular Environment.

D. Patterns of Change in O_2 uptake and CO_2 Output (external respiration) as related to function and fitness.

II. **Physiology related to Test protocols that measure Maximum Oxygen Consumption (VO_2 max tests).**

(As opposed to predictive tests for VO_2 max)

A.

1. Fatigue
2. Dyspnea
3. Pain

B. (Continued) Physiology related to Test protocols that measure Maximum Oxygen Consumption (VO_2 max tests).

1. Substrate Utilization
2. O_2 cost of work
3. Lactate Increase and Anaerobic Threshold
4. Kinetics

III. **A. Dysfunction of the Cardio Respiratory Systems** Blood Pressure and Hypertension

B. Dysfunction of the Cardio Respiratory Systems

1. Heart/ CV Disease

C. Ventilatory Disorders

IV. **Testing for Cardiorespiratory Fitness**

Pre test control

A. Criteria for a good test of CV fitness.

B. Criteria for stopping a test. Symptoms

C. Criteria for stopping a test: Blood Pressure

- D. Criteria for stopping a test: HR response
- E. Submaximal Lab Tests
- F. Maximal Tests
 - Purposes*
- G. Testing Protocols and their effect on Aerobic Function
- H. Field and Performance tests for determining VO₂ max
- I.VO₂ max

V. The interplay between Science and the Application of the Science.

Notes

Components of maximal testing

**Detaching your brain.
 Emotional incapacitation**

Article

Monitoring high intensity endurance exercise with heart rate and thresholds
 Marcel R Boulay, JA Simoneau, Gilles Lortie, Claude Bouchard
 Med Sci Spt Ex. Vol 29, No1, 125-132

**Chapter 2
 ECG/EKG**

- I. **History**
 - II. **Rhythmic Excitation of the Heart**
 - 1. *The heart as excitable tissue.*
 - 2. *Action Potentials*
- Figure: 1.Evolution of PQRST.
- 2. Limb leads.
 - 3. Augmented limb leads.
 - 4. Precordial leads.
- III. **EKG Interpretation**
 - 1. Rate
 - 2. Rhythm
 - 3. Axis
 - 4. Hypertrophy
 - 5. Infarction
- 1. **Rate**
 - a.Ectopic Foci.
 - b. Rate :
 - c. Atrial Fibrillation
 - 2. **Axis:**
 - 3. **Infarction:**
 - 4. **Blocks:**
 - 5. **Rhythm:**

Chapter 3

- I. **Body Composition: Energy Expenditure**
 - A. Metabolism: RQ
 - B. Body Composition:**
 - 1. Behnke Classification Schema
 - 2. Summary of Behnke Model
 - 3. Brozek/Siri Model
 - 4. Chemical Model
 - 5. Anatomical Model
 - C. Special Considerations: Estimation of Basal Metabolic Rate**
- II. **Ideal Body Composition**
- III. **Prevalence of Body Weight**
- IV. **Methods of Assessing Body Composition**
 - 1. BMI
 - 2. Waist to Hip Circumference Ratio (WHR)
 - 3. Body Types
 - 4. Height-Weight Tables
 - 5. Skinfold measurements
 - b. Sources of Error**
 - 1. Caliper selection:
 - 2. Tester reliability:
 - 3. Constant Compressibility
 - 4. Skin thickness;
 - 5. Constant fat fraction:
 - c. Prediction Equations**
 - 6. Hydrostatic Weighing**
 - a. Assumptions
 - b. Densitometry and Hydrostatic Weighing Techniques
 - 7. Bioelectric Impedance**

Article

Effects of training duration on substrate turnover and oxidation during exercise

S.M. Philips, H.J. Green, M.A. Tarnopolsky,
G.J. Heigenhauser, R.E. Hill and S.M. Grant
J. Appl. Physiol. 81(5):2182-2191

Chapter 4 Physiological Testing

- I. **Skeletal Muscle: Fibre Type, Glycogen and Metabolic Capacity**
 - 1. Percutaneous biopsy technique:
 - 2. Technique
 - 3. Fibre typing: Recognition of Fibre type
 - 4. Stains
 - NADH tetrazolium reductase
 - Periodic-acid Schiff stain

5. Assays: Manufacturing Metabolism

Blood/Muscle Lactate:

PFK

HK

SDH + CS

Above information used for indication of Skeletal Muscle and Function:

**Chapter 5
CSEP-PATH Certification**

- I. Determinants of Health**
- II. Role of Appraiser**
- III. Health Benefits**

- IV. Changing your lifestyle**
 - A. Understanding Behaviour Change
 - B. Structure of Self Esteem
 - C. SE affects Behaviours:
 - D. Factors inherent in SE:
 - E. Self Esteem effected by perceptions:
 - F. Self esteem is Learned
 - Unconditional Acceptance
 - Conditional Acceptance
 - Bottom Line Concept:

- V. Factors Affecting Participation in Physical Activity (change/growth)**
 - A. Reasons for activity:
 - B. Beliefs:
 - C. Attitudes:
 - D. Intentions:

- VI. Process or Stages of Change**

- VII. Counseling**
 - Issues requiring referral to experts

- VIII. Goals:**
- IX. CSEP – History – Advise – Relapse – Case Studies**

Upon completion of this course, students will be able to perform the following fitness appraisal tests:

Lab Topics

Pre-Screening (GAQ, consent forms, etc.), Resting Heart Rate and Blood Pressure
CSEP Aerobic Fitness tests
ECG
Body Composition
Musculoskeletal Fitness

Required Course Material/Text:

All required readings will be posted on OWL.

Recommended Text: *CSEP-PATH* Manual

Course Evaluation:

Evaluation:

1. Mid-term: Thursday, October 24: 5:30pm (rm TBA) (20%)
2. Lab exam: Friday, November 29: 7:00 (20%)
3. Practical Exam: TBD (15%)
4. Lab assignments (5) (5%)
5. Lab tutorials (5) (5%)
6. Personal Health Analysis (5%)
6. Final exam: TBA during December exam period. (30%)

Assignments/tutorials/personal health analysis are due as stated in the course syllabus/OWL and will not be accepted late, except under medical or other compassionate circumstances. Submitting a late assignment/tutorials/personal health analysis without appropriate documentation will result in a zero (0) grade. A missed mid-term examination, 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.

Lab attendance is MANDATORY. Missing a lab without appropriate documentation (through an academic counselor) will result in a mark of 0 on your assignment AND tutorial for the associated lab topic.

Course/University Policies

1. Statement on Use of Personal Response Systems (“Clickers”)

If Personal Response Systems (“Clickers”) are used in the course, a reference to the Guidelines for their use (Guidelines are shown below). Instructors are to communicate clearly to students information on how clickers are used including: how the student’s privacy will be protected, how clickers may be used by the instructor for data gathering and for evaluating the students, and why they cannot be used by anyone but the student (since the students involved in misuse of a clicker may be charged with a scholastic offence).

2. **Academic offences:** They are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

A) Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All required 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 for such checking 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 <http://www.turnitin.com>

B) 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. Electronic Device Usage:

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 of the following electronic devices during ANY of the tests, quizzes, midterms, examinations, or other in-class evaluations: cellphones, smart phones, smart watches, smart glasses, audio players or recorders of any sort, video cameras,

video games, DVD players, televisions, laptop/notebook/netbook computers, flashlights or laser pointers.

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. Please be respectful to your fellow students and turn the sound off. If the professor receives complaints from other students regarding noise or other disruptive behavior (e.g. watching videos on YouTube.com, updating your Facebook status, playing Solitaire), your classroom privileges will be revoked. 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.**

4. 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.

5. Support Services

There are various support services around campus and these include, but are not limited to:

1. Student Development Centre -- <http://www.sdc.uwo.ca/ssd/>
2. Student Health & Wellness -- <http://www.health.uwo.ca/>
3. Registrar's Office -- <http://www.registrar.uwo.ca/>
4. Ombudsperson Office -- <http://www.uwo.ca/ombuds/>

6. Documentation for Academic Accommodation (Illness, Medical/Non-Medical Absences):

http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_12

Students who experience an extenuating circumstance (illness, injury, or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) Submitting a Self-Reported Absence (see below for conditions)
- (ii) For medical absences exceeding 48 hours, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to their Academic Counselling in their Faculty of registration in order to be eligible for Academic Consideration; or
- (iii) For non-medical absences exceeding 48 hours, submitting appropriate documentation (e.g., obituary, police report, accident report, court order, etc.) to Academic Counselling in their Faculty of registration in order to be eligible for academic consideration. Students are encouraged to contact their Academic Counselling unit to clarify what documentation is appropriate.

Students seeking academic consideration **must communicate with their instructors no later than 24 hours** after the end of the period covered by either the self-reported absence or SMC, or immediately upon their return following a documented absence.

The following conditions are in place for self-reporting of medical or extenuating circumstances:

- a. a maximum of two self-reported absences between September and April and one self-reported absence between May and August;
- b. any absences in excess of the number designated in clause a above will require students to present a Student Medical Certificate (SMC) or appropriate documentation supporting extenuating circumstances to the Academic Counselling unit in their Faculty of registration no later than two business days after the date specified for resuming responsibilities.
- c. The duration of the excused absence will be for a maximum of 48 hours from the time the Self-Reported Absence form is completed through the online portal, or from 8:30 am the following

morning if the form is submitted after 4:30 pm;

d. The duration of the excused absence will terminate prior to the end of the 48 hour period should the student undertake significant academic responsibilities (write a test, submit a paper) during that time;

e. The duration of an excused absence will terminate at 8:30 am on the day following the last day of classes each semester regardless of how many days of absence have elapsed;

f. Self-reported absences will not be allowed for scheduled final examinations; for midterm examinations scheduled during the December examination period; or for final lab examinations scheduled during the final week of term;

g. Self-reporting may not be used for assessments (e.g. midterm exams, tests, reports, presentations, or essays) worth more than 30% of any given course;

For medical and non-medical absences that are not eligible for self-reporting Kinesiology students must submit an Academic Consideration Request form found online

https://www.uwo.ca/fhs/kin/undergrad/files/accommodation_request.pdf in addition to an SMC or appropriate documentation in the event of a non-medical absence. These 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.

7. **Grades:** Where possible assignment objectives and rubrics will be posted on OWL. Should you have a concern regarding the grade you received for an assignment or feel that it is unfair in any way, you must wait 24 hours from the receipt of the assignment to approach the instructor or TA. In doing so, please make an appointment and prepare in writing, with evidence, why you feel your grade is inappropriate. Please be aware that in requesting a grade reassessment, your grade could go up/down/or stay the same. Note that calculations errors (which do occur!) should be brought to my attention immediately.

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

- November 9th, 2019 (for first term half-courses)
- November 27th, 2019 (for full-year courses)
- March 4th, 2020 (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</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% will occur in this course).

8. **Classroom Behaviour:** Class will begin promptly at the time specified at the top of page one of this syllabus. In the event that you must arrive late, please enter the classroom with a minimal disturbance to the class. Please keep all electronic devices on silent and avoid distracting classmates.

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>