

Western University  
Faculty of Health Sciences  
**School of Kinesiology**

**KIN 3337b - Physiology of Fitness Appraisal  
Winter 2021**

<p><b>Instructor:</b> Dr. Glen Belfry <b>Office:</b> Arts &amp; Humanities Bldg Rm 3G24 <b>Email:</b> <a href="mailto:gbelfry@uwo.ca">gbelfry@uwo.ca</a> <b>Phone:</b> 519/661-2111 x88364 <b>Office Hours:</b> by appointment</p> <p><b><u>LABS</u></b> <b>Instructor:</b> Michael Herbert <b>Office:</b> Arts &amp; Humanities Bldg Rm 3G04 <b>Email:</b> <a href="mailto:mherber5@uwo.ca">mherber5@uwo.ca</a> <b>Phone:</b> 519/661-2111 x88675 <b>Office Hrs:</b> Will be posted at beginning of semester</p> <p><b>TAs:</b> TBD</p>	<p><b>Lectures: Lectures will be live Mondays and Tuesdays at 11 am.</b></p> <p><b>Lab</b> (Room AHB1R43)</p> <table> <tr><td>002 and 003</td><td>Mo</td><td>8:30am - 10:30 am</td></tr> <tr><td>004 and 005</td><td>Mo</td><td>11:30am - 1:30pm</td></tr> <tr><td>006 and 007</td><td>Tu</td><td>9:30am – 11:30am</td></tr> <tr><td>008 and 009</td><td>Tu</td><td>12:30pm - 2:30pm</td></tr> <tr><td>010 and 011</td><td>Th</td><td>1:30pm - 3:30pm</td></tr> <tr><td>012 and 013</td><td>Fr</td><td>8:30am - 10:30am</td></tr> <tr><td>014 and 015</td><td>Fr</td><td>11:30am - 1:30pm</td></tr> </table> <p>Labs will be offered every other week (similar to KIN2230). Even number lab sections will begin the week of January 18, and odd number lab sections will begin the week of January 25</p>	002 and 003	Mo	8:30am - 10:30 am	004 and 005	Mo	11:30am - 1:30pm	006 and 007	Tu	9:30am – 11:30am	008 and 009	Tu	12:30pm - 2:30pm	010 and 011	Th	1:30pm - 3:30pm	012 and 013	Fr	8:30am - 10:30am	014 and 015	Fr	11:30am - 1:30pm
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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 (every two weeks). 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 ( $\text{VO}_2$  Max)

**B. Coupling**

Steady State:  $\text{VO}_2 = \text{CO}_2$

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

**D. Patterns of Change in  $\text{O}_2$  uptake and  $\text{CO}_2$  Output (external respiration) as related to function and fitness.**

**II. Physiology related to Test protocols that measure Maximum Oxygen Consumption ( $\text{VO}_2$  max tests).**

*(As opposed to predictive tests for  $\text{VO}_2$  max)*

**A.**

1. Fatigue
2. Dyspnea
3. Pain

**B. (Continued) Physiology related to Test protocols that measure Maximum Oxygen Consumption ( $\text{VO}_2$  max tests).**

1. Substrate Utilization
2.  $\text{O}_2$  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 VO<sub>2</sub> max**

**I. VO<sub>2</sub> max**

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

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*Notes*

*Components of maximal testing*

**Detaching your brain.**

**Emotional incapacitation**  
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**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 Assessments
ECG
Body Composition
CSEP Musculoskeletal Fitness Assessments

**Required Course Material/Text:**

All required readings will be posted on OWL.

**Recommended Text:** *CSEP-PATH* Manual

**Course Evaluation:**

**Evaluation:**

1. Mid-term: Thursday, Feb 25\_5:30pm (On OWL) (20%)
2. Lab exam: Friday, March 19 (Time TBA) (20%)
3. Practical Exam: TBD (15%)
4. Lab assignments (5) (5%)
5. Lab tutorials (5) (5%)
6. Final exam: TBA during December exam period. (35%)

Assignments/tutorials/quizzes 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/quiz without appropriate documentation will result in a 50% reduction of your grade for that evaluation. 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 the misuse of a clicker may be charged with a scholastic offense).

2. **Academic offenses:** 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](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](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 render them unable to meet academic requirements temporarily 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 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 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 above the number designated in clause I 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](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 your grade could go up/down/or stay the same in requesting a grade reassessment. Note that calculation 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>