

Western University Faculty of Health Sciences
School of Kinesiology

KIN3337A - Physiology of Fitness Appraisal
Fall 2022/Winter 2023

<p>Instructor: Dr. Glen Belfry Email: gbelfry@uwo.ca Phone: 519/661-2111 x88364 Office Hours: by appointment only</p> <p>TAs: TBD</p>	<p>Lectures: Wednesday: 9:30 am -10:30 am Friday: 9:30 am – 10:30 am Room: B&GS-0165</p> <p>Fall 2022 Instruction Mode: In person ONLY.</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):

An overview of those factors associated with appraising body composition, fitness and strength. The construction and the effective administration of physical health and wellness tests including, cardiovascular fitness, body composition and strength. Several of these are based on the Canadian Society of Exercise Physiology Personal Training Certification.

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.

Statement on Prerequisite Checking

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.

Physiology of Fitness Appraisal

The course is divided into 4 chapters. There are several lectures in each chapter.

The chapters (in order) are:

1. Body composition
2. Skeletal Muscle Composition: Fibre Type, Glycogen and Metabolic Capacity
3. Coupling of metabolism, cardiac output, and respiration during exercise
4. ECG and heart function
5. CSEP-PATH (Physical Activity Training for Health)

Upon completion of this course, students will understand the physiological basis of fitness appraisal and be able to apply this knowledge and safely perform the following fitness appraisal tests (see Lab Topics below):

Lab Topics

Pre-screening (questionnaires, RHR and RBP)
Height, Weight, Waist Circumference, Skinfolds and BIA
Aerobic Fitness (MCAFT, YCMA cycle ergometer and Ebelling treadmill tests)
MSK Fitness (sit and reach, vertical jump, one leg stance, grip strength, push up, forearm plank and y-balance test)
ECG

Required Course Material/Text:

All required readings will be announced in class and posted on OWL.

Recommended Text: *CSEP-PATH* Manual

(Professor Mike Herbert will be offering the CSEP-Path Certification for those Interested)

Course Evaluation:

Evaluation:

1. Mid-term: Wednesday October 26, 5:30-6:15 pm, 2022 (20%)
2. Practical Exam: Weeks of November 14 and 21, 2022 (30%)
3. Completion of Data collection in labs. (5%)
4. Final exam: TBA during December exam period. (45%)

- 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.
- Since the midterm is scheduled outside of regular class hours, an opportunity to write a makeup tests will b available. Opportunities to write a makeup Midterm test will only be given to those students with conflicting class sessions, other tests, or university-sanctioned activities. These must be confirmed with a Kin academic counsellor.
- Missing labs without appropriate documentation (accommodation through an academic counselor) will result in a mark of 0 on that days Data collection assignment.

Lecture outline:
Physiology of Fitness Appraisal
Chapter 1

Introduction: Our World and Body Composition

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

1. Hydrostatic Weighing

- a. Assumptions
- b. Densitometry and Hydrostatic Weighing Techniques

2. 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 2

I. Skeletal Muscle Composition: 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 3

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

Maximal Oxygen Consumption (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 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 (VO₂ max tests).

- 1. Substrate Utilization
- 2. O₂ 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**

Notes

Components of maximal testing

Detaching your brain.

Emotional incapacitation

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

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 4 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 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**

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>