

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

|   |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
|---|-----------|---|----|------------------------------|--|------------------|--|------------------------|--|--|--|----------------------------|---|----------------------|--|--------------|-----------|---|--|
| <b>Course Code and Number:</b> KIN 362  |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Course Full Title:</b> Theoretical Exercise Physiology<br><b>Course Short Title (if title exceeds 30 characters):</b> Exercise Physiology  |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Faculty:</b> Faculty of Health Sciences  |           | <b>Department (or program if no department):</b> Kinesiology  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Calendar Description:</b><br>Discusses the physiological response to exercise, examining both the acute and chronic adaptations to an exercise stress. From a physiological systems perspective, this course examines the functional capacity of individual physiological systems discussing the system's response to submaximal and maximal exercise and its impact on human performance. The environmental impact on physical performance is also discussed.<br><br>Note: Students with credit for KPE 362 cannot take this course for further credit. |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Prerequisites (or NONE):</b>   |           | Admission to the Bachelor of Kinesiology degree and 54 university-level credits including KIN 163 (formerly KPE 163) and KIN 270 (formerly KPE 270). Note: As of September 2019, prerequisites will change to: Admission to the Bachelor of Kinesiology degree and 60 university-level credits including KIN 163 (formerly KPE 163), KIN 270 (formerly KPE 270), and (KIN 272 or KIN 370 [formerly KPE 370]).<br><br>Note: Students who have declared a Kinesiology minor can contact the department for permission to register.  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Corequisites (if applicable, or NONE):</b>   |           | NONE  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>   |           | KIN 370 (formerly KPE 370).   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: <b>KPE 362</b><br>Cross-listed with:<br>Equivalent course(s): <b>KPE 362</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>  |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OReg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br><br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b>  |           | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <table border="1"> <tr><td>Lecture hours</td><td>40</td></tr> <tr><td>Seminars/tutorials/workshops</td><td></td></tr> <tr><td>Laboratory hours</td><td></td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td>5</td></tr> <tr><td>Other contact hours:</td><td></td></tr> <tr><td><b>Total</b></td><td><b>45</b></td></tr> </table>  |           | Lecture hours   | 40 | Seminars/tutorials/workshops |  | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities | 5 | Other contact hours: |  | <b>Total</b> | <b>45</b> | <b>Maximum enrolment (for information only):</b> 36<br><br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> twice annually |  |
| Lecture hours   | 40        |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| Seminars/tutorials/workshops  |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| Laboratory hours  |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| Field experience hours  |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| Experiential (practicum, internship, etc.)  |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| Online learning activities  | 5         |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| Other contact hours:  |           |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Total</b>  | <b>45</b> |   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Department / Program Head or Director:</b> Alastair Hodges   |           | <b>Date approved:</b> October 2017  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Faculty Council approval</b>   |           | <b>Date approved:</b> October 2017  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Campus-Wide Consultation (CWC)</b>   |           | <b>Date of posting:</b> November 24, 2017   |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Dean/Associate VP:</b> Joanne MacLean  |           | <b>Date approved:</b> October 2017  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |
| <b>Undergraduate Education Committee (UEC) approval</b>   |           | <b>Date of meeting:</b> March 23, 2018  |    |                              |  |                  |  |                        |  |  |  |                            |   |                      |  |              |           |   |  |

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Describe the acute and chronic adaptations of bodily systems to submaximal and maximal exercise.
2. Examine the control of and regulation of metabolic pathways during exercise
3. Describe the process of recovery from exercise
4. Calculate work, power, max V<sub>O2</sub>, and respiratory volumes
5. Describe the physiological (neuromuscular, cardiovascular, respiratory, and humoral) response to submaximal exercise
6. Demonstrate the functional capacity of the physiological systems and their impact on human performance
7. Discuss the influence of the environment on human performance

**Prior Learning Assessment and Recognition (PLAR)**

Yes       No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lecture, small group review, case studies (calculations)

**Grading system:** Letter Grades:  Credit/No Credit:       Labs to be scheduled independent of lecture hours: Yes  No

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

|    | Author (surname, initials)              | Title (article, book, journal, etc.)   | Current ed.                         | Publisher      | Year |
|----|---|--|-------------------------------------|----------------|------|
| 1. | McArdle, W.D., Katch, F.I., Katch, V.L. | Exercise Physiology: Nutrition, Energy, and Human Performance, 8 <sup>th</sup> ed. | <input checked="" type="checkbox"/> | Wolters Kluwer | 2014 |
| 2. |   |  | <input type="checkbox"/>            |                |      |
| 3. |   |  | <input type="checkbox"/>            |                |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)****Typical Evaluation Methods and Weighting**

|                    |     |              |   |                   |     |            |    |
|--------------------|-----|--------------|---|-------------------|-----|------------|----|
| Final exam:        | 40% | Assignments: | % | Midterm exam (2): | 50% | Practicum: | %  |
| Quizzes/tests (6): | 10% | Lab work:    | % | Field experience: | %   | Shop work: | %  |
|                    |     | Other:       | % | Other:            | %   | Total:     | 0% |

**Details (if necessary):****Typical Course Content and Topics**

1. Introduction of Exercise Physiology
  - 1.1 historical perspective
  - 1.2 homeostasis: dynamic
2. Bioenergetics
  - 2.1 control of bioenergetics:
    - 2.1.1 phosphagens
    - 2.1.2 glycolysis
    - 2.1.3 mitochondrial respiration
  - 2.2 exercise metabolism
    - 2.2.1 rest-to-exercise transition
    - 2.2.2 intensity and duration
    - 2.2.3 fuel utilization and selection
  - 2.3 recovery from exercise
3. Measurement of Energy, Work and Power
  - 3.1 ergometry
    - 3.1.1 calculation of work during treadmill and cycle ergometry
  - 3.2 measurement of energy expenditure
  - 3.3 caloric equivalent of oxygen
  - 3.4 exercise efficiency
4. The Muscular System
  - 4.1 motor unit
    - 5.1.1 gradation of force
    - 5.1.2 muscle fibre type
    - 5.1.3 force-velocity relationship
  - 4.2 muscle fatigue

#### 5. Pulmonary Ventilation

- 5.1 gas analysis for detection of the anaerobic threshold
- 5.2 respiratory exchange ratio
- 5.3 respiratory limitations to exercise

#### 6. Cardiovascular System

- 6.1 review the cardiac cycle and blood flow
- 6.2 hemodynamics
  - 6.2.1 calculation of total peripheral resistance, cardiac output, application of the Fick equation
- 6.3 circulatory response to exercise
  - 6.3.1 acute and chronic adaptations in response to submaximal exercise
  - 6.3.2 acute and chronic adaptations in response to maximal exercise
- 6.4 maximal oxygen consumption
  - 6.4.1 calculation of work and oxygen cost
  - 6.4.2 calculation of efficiency

#### 7. Acid-Base Regulation

- 7.1 acid-base buffering system
- 7.2 respiratory involvement

#### 8. Exercise and the Environment

- 8.1 heat and cold
- 8.2 altitude
- 8.3 pollution