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THE UNIVERSITY OF BRITISH COLUMBIA

**School of Health and Exercise Sciences ~ HES 321
Laboratory Techniques in Exercise Science
Course Outline,
Winter 2023 (3 credits)**

Instructor: Dr. Changki Kim, PhD
Dr. Travis Gibbons, PhD
Office: ART 122 (Chang)
ART 184 (Travis; does not have office hours, email for meeting request)
Office Hours: Online [Link](#) – Tuesday at 8 am
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Lecture and lab times and location:

**Lecture location: FIP 204
Monday & Wednesday; 3:30 – 5:00 pm**

LAB:

L01	Monday	8:00 – 11:00
L02	Monday	11:00 – 2:00
L03	Tuesday	8:00 – 11:00
L04	Tuesday	3:30 – 6:30
L05	Wednesday	12:30 – 3:30
L06	Thursday	8:00 – 11:00
L07	Thursday	11:00 – 2:00
L08	Thursday	3:30 – 6:30
L09	Friday	8:00 – 11:00
L10	Friday	2:00 – 5:00

Academic Calendar Course Description:

Current methods in exercise science will be demonstrated via modules presented by faculty in their areas of specialization including electrophysiological techniques and methods of assessing breathing, heart rate, blood pressure and reflex mechanisms.

Course overview and format:

This course focuses on the research techniques used to investigate human physiology. Students will learn about the theory behind common equipment used and the applications of the associated data collected through lectures, labs and the review of relevant journal articles.

Learning objectives:

During the course, students will:

- Develop critical thinking skills and understanding of cardiorespiratory, autonomic, metabolic, and neurophysiology research
- Develop a deep understanding of the strengths and limitations of various physiology techniques
- Analyze and interpret data collected in the laboratory to gain insight into the underlying physiological mechanisms

Evaluation Criteria and Grading:

Lecture:

Journal Club Presentation	10%
	<i>Each group member is assigned the same grade based on quality of presentation</i>
Journal Club Quiz	10%
	<i>There will be 8 online quizzes activated during Journal Club presentations; students <u>must complete 6 of 8 quizzes.</u></i>
Neuromuscular Exam	20%
Cardiovascular Exam	20%

Laboratory:

Laboratory reports: 40% (20% for neuromuscular lab report, 20% for cardiorespiratory lab report)

Please note that you must receive a passing grade in the lab and lecture part of the course to pass this course.

Grading Scheme:

Percentage (%)	Letter Grade
90 - 100	A+
85 - 89	A
80 - 84	A-
76 - 79	B+
72 - 75	B
68 - 71	B-
64 - 67	C+
60 - 63	C
55 - 59	C-
50 - 54	D
0 - 49	F (Fail)

Required Text and/or readings:

This course does not have a textbook. Instead, original research and review articles (required and optional) will be posted to *Canvas* as the term progresses. A basic physiology textbook may be helpful as a resource.

Lecture and Lab Attendance:

Lecture attendance is not mandatory for this semester (although it usually is), but is highly recommended, as material discussed during the online lecture will be on the major exams and assignments for this course. Online quizzes will be uploaded during each Wednesday lecture that has a group journal club presentation. The quiz content will be based upon the journal articles being presented in class, and will contain information that is testable in the midterms and final exam. For full marks, students must complete 6 of the 8 quizzes, i.e., you have 2 excusable absences. If you complete all 8 quizzes, your 6 highest scores will be used toward your grade. Class participation is encouraged and has also been found to lead to higher grades. The text and/or notes, other resources are easily accessible at anytime, but it is impossible to duplicate the discussion, activities, challenge and interaction that take place in the classroom.

Tentative Course Schedule:

Date:	Lecture Topic:	Lab Exercise:
<i>Jan 9</i>	<i>Introduction</i>	<i>No Lab</i>
<i>Jan 11</i>	<i>Data Analysis</i>	
<i>Jan 16</i>	<i>Measuring Force</i>	<i>Statistics</i>
<i>Jan 18</i>	<i>Journal Club & Quiz #1</i> <i>(Force steadiness)</i>	
<i>Jan 23</i>	<i>Electromyography</i>	<i>Strength and Force Steadiness</i>
<i>Jan 25</i>	<i>Journal Club & Quiz #2</i> <i>(EMG)</i>	
<i>Jan 30</i>	<i>Gait Analysis</i>	<i>EMG & Force relationship</i>
<i>Feb 1</i>	<i>Journal Club & Quiz #3</i> <i>(Gait)</i>	
<i>Feb 6</i>	<i>Force Plate for Balance</i>	<i>EMG & Force relationship</i>
<i>Feb 8</i>	<i>Journal Club & Quiz #4</i> <i>(Balance)</i>	
<i>Feb 13</i>	<i>fMRI/MRI/EEG/TMS</i>	<i>Arm Crank Ergometry & EMG</i>
<i>Feb 15</i>	<i>Neuromuscular Exam</i>	

Reading Break Feb 20th – 24th

<i>Feb 27</i>	<i>Introduction/Experimental Design</i>	<i>Ventilation in exercise</i>
<i>Mar 1</i>	<i>Measuring Ventilation</i>	
<i>Mar 6</i>	<i>Control of Breathing</i>	<i>Ventilation in exercise</i>
<i>Mar 8</i>	<i>Journal Club & Quiz #5</i> <i>(Exercise and fatigue)</i>	
<i>Mar 13</i>	<i>O₂ and CO₂ Gas Analysis</i>	<i>CO₂ Rebreathe</i>
<i>Mar 15</i>	<i>Journal Club & Quiz #6</i> <i>(Chemoreflex control in exercise)</i>	
<i>Mar 20</i>	<i>Exercise Physiology</i>	<i>CO₂ Rebreathe</i>
<i>Mar 22</i>	<i>Journal Club & Quiz #7</i> <i>(Baroreflex in exercise)</i>	
<i>Mar 27</i>	<i>Metaboreflex control</i>	<i>Muscle metaboreflex</i>
<i>Mar 29</i>	<i>Journal Club & Quiz #8</i> <i>(Assessing exercise adaptations)</i>	
<i>Apr 3</i>	<i>Exercise adaptations</i>	<i>Muscle metaboreflex</i>
<i>Apr 5</i>	<i>Blood flow</i>	
<i>Apr 10</i>	<i>Brain blood flow control</i>	<i>No Lab</i>
<i>Apr 12</i>	<i>Cardiorespiratory exam review</i>	

Final Exams Apr 17th – 28th

Expectations:

As your instructors we expect from you: punctuality, effort, professional conduct and work, and respect for your classmates, instructor and yourself. You can expect the same from us. As we are all lifelong learners we will strive to make the class an optimal learning environment for everyone. This can be facilitated by your communication with us, throughout the entire course, about positive components of the class process as well as your concerns. Your TA's should be your first line of communication should you have questions about course and lab content.

Course Policies:

Please refer to the UBCO and HES websites for full details of our academic policies. All UBC, FHSD and School of Health and Exercise Sciences Policies apply. You are responsible to be familiar with all policies as necessary for your situations and success. Below outlines some of these policies.

Assignments and Exams

1. Assignments are due at the specified due date and time indicated on the course/lab schedule; after that, the assignment will be considered 1 day late; assignments received within 24 hours of due date = a penalty of 20%; within 24+ – 48 hours of due date = a penalty of 50%; 48+ hours or greater of due date = a grade of 0; assignment will not be accepted.
2. A hard copy of all assignments must be handed in unless otherwise indicated by the instructor.
3. Late assignments will be considered for marking if students were ill or missed the due date for some other related and acceptable reason (see details on HES website).
4. Of the 8 quizzes that will be made available on Canvas during lecture periods, you must complete 6 for full grades. The material in these quizzes may be on the midterm and final exam, and so there is value in completing all quizzes. Given that you must only complete 6 of the 8 quizzes for full marks, we will not excuse any additional missed quizzes for any reason.
5. Assignments must have the appropriate title page (see HES website for examples)
6. Missed exams and deferred exams;
 - The standard UBCO policy for this issue will be followed and applied
 - A doctor's note must be submitted to the course instructor if you missed a lab, exam, assignment due date etc. due to illness; **the required medical form to be completed is on the HES website under "forms"**
 - Communication to the instructor upon realization student will not be at exam, is imperative; PRIOR to exam/lab etc. is preferred, but within 24 hours maximum
 - It is up to each individual instructor as to how they will deal with missed exams
7. Writing final exams early is not permitted.
8. No dictionaries are allowed during exams.
9. HES does not allow extra assignments etc. at the end of courses in order to make up grades or to try and earn a few more grades; the assigned course work must be completed

within the course. *“Failure to plan on your part does not constitute an emergency on our part.”*

10. HES students must achieve a 65% average in their HES courses and 60% in their other courses, each year, to progress to the next year within the degree program. If a student falls below in either or both categories, a student is on probation for the next term (meaning they can only take 3 courses) and must achieve the required average to continue in the program. If they do not, then they will be removed from the program.

Course Communication and other Details

11. Phones and computers
 - Phones must be put away and turned off for the duration of all classes, labs and exams
 - Computers may only be used for course purposes during class/lab time
 - Students misusing electronics during class/lab time maybe asked to leave
12. All email communication must be professional, courteous and concise with subject, name, student number and course indicated. If this is not followed then faculty members are not obligated to respond. (see HES website for detailed policy on this manner)
13. All written communication, including exams, must be legible; if not, the instructor is not obligated to read/mark it.
14. Course concerns
 - Should questions and concerns arise relating to course content and details then students must first communicate these with their TA's or instructors immediately
 - If further help or discussion is required the students can communicate with their HKSU undergraduate representative, the undergraduate coordinator, or the director
 - Students are expected to act in a professional manner and in confidence until the issue is resolved
15. ***If this is a lab course:*** All lab policies must be followed. (see HES website, your lab manual and lab classrooms for details of these)
16. ***Please note that as per HES faculty policy students cannot take a course more than twice; ie. If you fail this course twice, you cannot take it again, unless approved by the director.***
17. Please note that this course outline is NOT comprehensive. Details of course content and assignments etc. will be given during class and lab time and it is the STUDENT'S responsibility to ensure they have all the material delivered.
18. Instructors will encourage/facilitate/support at least one short standing/movement break in all lecture-based classes for every 50 minutes of class time and will allow students to stand for parts of class where appropriate.

Final Examinations

The final examination period is April 17 – 28th 2023. The final exam will contain only content from the midterm onward, i.e., the cardiorespiratory material taught by Dr Gibbons. Except in the case of examination clashes and hardships (three or more formal examinations scheduled

within a 24-hour period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job. Further information on Academic Concession can be found under Policies and Regulation in the *Okanagan Academic Calendar* <http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0>

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at <http://okanagan.students.ubc.ca/calendar/index.cfm?tree=3,54,111,0>.

Student Services Resources:

UBC Okanagan Disability Resource Centre - www.students.ok.ubc.ca/drc

The DRC facilitates disability-related accommodations and programming initiatives to remove barriers for students with disabilities and ongoing medical conditions. If you require academic accommodations to achieve the objectives of a course please contact the DRC.

Student Wellness - www.students.ok.ubc.ca/health-wellness

At UBC Okanagan health services to students are provided by Student Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Student Wellness for more information or to book an appointment.

Student Learning Hub - www.students.ok.ubc.ca/slh

The Student Learning Hub is your one-stop-shop for free and flexible learning supports and resources. We invite UBCO students from all disciplines and year levels to access a range of supports from peers and professionals that include tutoring in math, sciences, languages, and writing, as well as help with

study skills and learning strategies. Visit us early and often to build the skills, strategies, and behaviours that are essential to being a confident and independent learner.

UBC Okanagan Equity and Inclusion Office - <https://equity.ok.ubc.ca/>

Through leadership, vision, and collaborative action, the Equity & Inclusion Office (EIO) develops action strategies in support of efforts to embed equity and inclusion in the daily operations across the campus. The EIO provides education and training from cultivating respectful, inclusive spaces and communities to understanding unconscious/implicit bias and its operation within in campus environments. UBC Policy 3 prohibits discrimination and harassment on the basis of BC's Human Rights Code. If you require assistance related to an issue of equity, educational programs, discrimination or harassment please contact the EIO.

Office of the Ombudperson - <https://ombudsoffice.ubc.ca/campus-resources/okanagan-campus/>

The Office of the Ombudperson for Students is an independent, confidential and impartial resource to ensure students are treated fairly. The Ombuds Office helps students navigate campus-related fairness concerns. They work with UBC community members individually and at the systemic level to ensure students are treated fairly and can learn, work and live in a fair, equitable and respectful environment. Ombuds helps students gain clarity on UBC policies and procedures, explore options, identify next steps, recommend resources, plan strategies and receive objective feedback to promote constructive problem solving.