ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xʷməθkʷəy̓əm (Musqueam). The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

COURSE INFORMATION

Course Title	Course Code Number	Credit Value
Advanced Exercise Physiology, Assessment, and Prescription	KIN 500H	3

PREREQUISITES

Students should have a strong background in exercise physiology and some experience performing assessments and/or prescribing exercise to the general, clinical, and/or athletic populations.

KIN 562: Bioenergetics of Physical Activity is a prerequisite for this course. The course structure and assessments of learning will be similar. The content in this course (500H) is also a continuation from KIN 562. KIN 424 (with Dr. Michael Koehle) is not a prerequisite but it may also have relevant content.

CONTACTS

Course Instructor(s)	Contact Details	Office Location	Office Hours
Josh Bovard, PhD(c), MSc, CSEP-CEP	josh.bovard@ubc.ca	Chan Gunn Pavilion 221	By appointment

Please include "KIN 500H" in the subject line of all email communication.

General questions about course material should be posted as discussion topics on Canvas rather than sent via email. Attempting to teach or explain material over email can be difficult and ineffective. If you have detailed questions about course material or concepts, questions should be addressed in person (e.g., during or after synchronous sessions). Email should be used for a limited number of reasons, such as scheduling meeting times, in cases of emergency (e.g., that may cause you to miss an exam), or situations otherwise detailed in class. It may take up to 5 working days to respond to your email during the week and emails will not be checked on weekends. Please keep these in mind around important dates (e.g., assignment due dates).

COURSE DESCRIPTION AND STRUCTURE

This course will start with in-depth synchronous discussion of exercise physiology assessment in clinical practice. Then, asynchronous content will provide detailed theoretical knowledge on the integrated exercise physiological responses of the respiratory, cardiovascular, and muscle metabolic systems. The latter part of the course will explore applications through asynchronous content on the effects of exercising muscle mass, modalities, sex, and environment as well as synchronous presentations detailing physiology, assessment, and prescription in various populations.

General schedule: The course will consist of asynchronous and synchronous content over three parts of the course, as detailed below in the "Schedule of Topics".

Sychronous sessions (i.e., classes) will be typically be ~2 hours (with breaks), but may be up to 3 hours during weeks with student presentations (depending on the number of students in the course). They will take place in WMG 206/208.

You are required to attend all classes. You are responsible for all material covered in synchronous and asynchronous sessions and any information given whether in attendance or not. You are also responsible for getting your own notes, as well as information pertaining to changes in the course outline, readings, assignments, and information related to lectures.

If you are unable to attend class in-person (e.g., due to illness), please send an email as soon as possible. A Zoom link will be provided at the start of the course (see the "Zoom" section on Canvas) and will be used for those who are still able to participate virtually. This Zoom link is not intended to replace in-person attendance, but instead to facilitate participation when students have a legitimate reason for not being able to attend class in-person. Please note that attendance will be recorded at the beginning of each class.

SCHEDULE OF TOPICS

Week	Date	Synchronous content	Asynchronous content
PART 1 – ASSESSMENT: Experiences from the field			
1	January 8	NO CLASS	*"General informations and presentations" survey to be completed by January 15 (6:00pm). Presentation topics and dates to be posted after.*
2	January 15	**START AT 10 AM** *Discussion:* Syllabus review; Experiences from the field part 1	
3	January 22	**START AT 10 AM** Experiences from the field part 2 (Preparticipation evaluation, movement behaviours, & body composition)	
4	January 29	**START AT 10 AM**	

		Experiences from the field part 3 (Assessing movement & muscular fitness)	
5	February 5	**START AT 10 AM** Experiences from the field part 4 (Aerobic fitness testing)	
PART 2 – PHYSIOLOGY: Advanced exercise physiology			
6	February 12	NO CLASS	The oxygen cascade: determinants of VO_{2MAX}, lung O_2 conductance, and the respiratory system The oxygen cascade: convective O_2 transport The oxygen cascade: muscle O_2 condcutance, fibre type, and muscle mitochondrial physiology Genetics, molecules, and the adaptive response (or non-response) to chronic exercise
7	February 19	NO CLASS – BC Family Day & MIDTERM BREAK Feb 19-23	
8	February 26	NO CLASS	
9	March 4	NO CLASS Applications & prescription presentations (virtual)	
PART 3 – APPLICATIONS: Applied physiology & assessment, Applications & prescriptions projects			
10	March 11	*Applications & prescription presentations*	The oxygen cascade & exercising muscle mass The environment: heat, cold, hypoxia, hyperoxia, underwater, microgravity *"Knowledge translation assignment" due Friday, April 12 at 11:59pm.* *"Attendance", "Professionalism", and "Participation" self-assessments due Friday, April 12 at 11:59pm.*
11	March 18	NO CLASS	
12	March 25	*Applications & prescription presentations*	
13	April 1	NO CLASS – Easter Monday	
14	April 8	*Applications & prescription presentations* *Discussion:* Course wrap-up, final thoughts, and main takeaways	

	April 16-27	Final exam – date and time TBD	

Note: topics and dates are subject to change as needed.

LEARNING OUTCOMES

General aims and outcomes: The primary learning objective is for students to gain a greater understanding of the integrative physiological response to *aerobic* exercise and knowledge that can be applied in research, clinical, and/or athletic settings. The point of the course is *not* to memorize complex physiological mechanisms and pathways. Instead, the intended outcome is to appreciate important physiological mechanisms and pathways and understand their role in (1) determining the capacity to perform physical activity, (2) assessing physical fitness, and (3) prescribing physical activity for clinical, health, or athletic benefits.

"Big picture" questions:

1) What is precision vs. personalized exercise prescription and which should you use?
2) Are the lungs built for aerobic exercise?
3) How does cardiac output increase during aerobic exercise?
4) What determines your blood pressure at rest and during aerobic exercise?
5) When should you measure blood pressure during an aerobic exercise test and what does it mean?
6) What do you need to know about fibre type and how does it affect your exercise prescription?
7) How do muscle mass and modality change the physiological response to aerobic exercise?
8) What "limits" VO_{2MAX} at altitude?
9) How does the environment affect the physiological response to exercise and should it change exercise prescription?
10) How does the integrative physiological response to aerobic exercise change with aerobic fitness?
11) Does genetics determine the "response" to exercise and are there "non-responders" to exercise?

"Big picture" questions are not necessarily addressed solely in 1 lecture; instead, their answers are intended to be an integration of concepts discussed across many lectures.

LEARNING MATERIALS

Course text: No specific textbook is mandatory; however, students may benefit from having access to clinical exercise physiology textbooks for reference, such as:

ACSM's Clinical Exercise Physiology. Wolters Kluwer, 2019. (1st edition)

ACSM's Guidelines for Exercise Testing and Prescription. Wolters Kluwer, 2021. (11th edition, although recent previous editions should suffice)

Brukner & Khan's Clinical Sports Medicine. McGraw-Hill Education. 2017 (5th edition, although recent previous editions may suffice; while both volumes may be benefnicial, volume 2 will likely be more beneficial than volume 1)

Sietsema, Kathy E., Darryl Y. Sue, William W. Stringer, Susan Ward. Wasserman & Whipp's Principples of Exercise Testing and Interpretation. Wolters Kluwer, 2020. (6th edition (5th edition should suffice))

Canvas: Information about this course, asynchronous content, presentation slides, important reminders, and other reading and course notes will be posted on Canvas. Please check the site regularly, as *you are responsible for the information posted to Canvas*. Course notes will provide an overview of learning material but may not include all details and examples covered in asynchronous and synchronous sessions.

ASSESSMENTS OF LEARNING

Applications & prescription project	40%
Knowledge translation assignment	10%
Performance	10%
Final exam	40%

***the assessment of learning is subject to change*

Specific breakdown:

Applications & prescription project

Each student will do two presentations (one virtual, 20-minute presentation and one in-class, 10-minute presentation) on a clinical/health population related to course content. A list of populations will be provided on Canvas; however, if you want to present on a population not listed, please contact the course instructor. Similar to KIN 562, students will select preferences through the *"General information and presentations"* survey, with topics announced shortly thereafter. Initial resources *may* be provided in the list of populations, but you are not confined to these resources. You can include visual aids from these resources, presentation slides shown in class, or other sources including your own creation if you wish. It will be helpful for other students if you reference the original source of the content, as appropriate.

Virtual presentations will be 20 minutes on March 4 (time of day to be determined through the survey). The presentation should include background information about the population. It should then focus on physiology and pathophysiology, clearly highlighting how it connects to concepts presented in the course (and/or KIN 562, if applicable). Evidence-based preparticipation evaluation, assessment, and prescription with population-specific considerations (including contraindication), as appropriate, should also be included during the presentation. The virtual presentation will be worth 30 marks, as follows:

- *Quality of slides presented* (10 marks) – the slides are clear, concise, and provide reference to appropriate source materials (including references on slides, which is essential for tables and figures and used as appropriate for text). Any abbreviations are introduced during their initial use. When images and tables are presented, they are thoroughly explained (e.g., introduce the axes and legends for images, rows and columns for tables, abbreviations, etc.). As appropriate, text and information is introduced sequentially to effectively guide the observer through the information (e.g., using animations or an effective alternative). Content on slides is discussed, and presenters speak to the audience and content (instead of reading notes ad verbatim). Try to avoid slides with lots of text that are "static"; i.e., text takes a long time to go through without animations, text/figures, or interaction with the content (further to this, keep in mind that slides with lots of text can make it difficult for the audience to align what they are reading with what you are saying). If you aren't able to take the time to appropriately describe the table, figure, or text, then it should not be included. ***If generative AI is used, an appendix should detail what tool(s) were used, how they were used, and how the results from the AI were incorporated into the submitted work. This includes detailing content produced by an artificial intelligence tool, and the prompt used to generate the content. The appendix should be in the slide deck (it could consist of many slides), but it does not need to be presented.*
- *Organization of presentation* (10 marks) – the presentation follows a logical structure, with a clear flow from background to mechanisms to applications and prescription. There should be an "Overview" (or "Learning outcomes" or similar) slide at the beginning of the presentation that is referred to throughout the remainder of the presentation to guide the observer through the main sections of your presentation. Where helpful, sections can be numbered or colour-coded (e.g., Section 1 – xxx, Section 2 – yyy, etc.). Additionally, include 1-2 summary slides at the end of the presentation that appropriately captures the key takeaways from the presentations (note, summary slides *summarize* information; this is not the time to introduce *new* information) – i.e., if you could only share one slide (or two), what key background and application takeaways would you put on it? Lastly, an

appropriate number of slides should be used (e.g., "1-minute, 1-slide" for each slide with content). Marks may be deducted if the presentation is too short (e.g., <15 minutes) or long (e.g., >25 minutes). So, practice, practice, practice!

- *Description of appropriate physiological mechanisms* (10 marks) – relevant physiological mechanisms are discussed in detail and clearly explained, demonstrating an integration of course content (as appropriate). As appropriate, operationally definitions are provided. Population-specific considerations for prescreening, assessment, and prescription are also discussed.

Each student will also create a knowledge translation resource as well as 5 multiple choice questions related to the topic. These will be presented during 10-minute in-class presentations (~3-5 minutes knowledge translation resource, ~5-7 minutes multiple choice questions; dates will be assigned when topics are announced). The in-class presentation will be worth 10 marks, as follows:

- *Knowledge translation resource* (7 marks) – to enhance your ability to work with these populations, you will create a knowledge translation resource such as an infographic (e.g., using Canva or slidesgo). You are not limited to infographics, and can use other creative ways to translate knowledge such as a short digital whiteboard video (e.g., using VideoScribe) or a 1-page "cheat sheet". When presenting your knowledge translation resource, please ensure all parts are reviewed effectively in the allotted time.
- *Multiple choice questions* (3 marks) – clearly-worded multiple choice questions integrate material throughout the presentation. All options should appear plausible, but only one is correct. While not required, combining multiple questions into a case study can be beneficial. When presenting your questions, more interactive and engaging is better! Popular options in the past have included Kahoot and Mentimeter, but you are not limited to these. Feel free to get creative!

Once all in-class presentations are complete on a single day, a panel-style question and answer period will occur. The panel will consist of the presenters for that day.

As applicable, please save your presentation slides and knowledge translation resource as separate PDFs and email these to the course instructer to be posted on Canvas for the benefit of your classmates and fair assessment. The multiple choice questions will be uploaded as separate documents for the (1) questions and (2) answers on the "Applications & prescription review questions" discussion.

Knowledge translation assignemnt

This course will cover many detailed and complex physiological topics. However, as future researchers, clinicians, and sports scientists, effectively synthesizing and communicating these topics to a general audience is essential. Thus, for this assignment you will provide a 2-3-sentence answer to each of the "big picture" questions presented in the *Learning Outcomes* above as well as each of populations presented in class. The questions should be answered as if you are describing them to a general audience (think of it like an elevator pitch; if you had 30-60 seconds to communicate your most important points, what would you say?). The purpose is to prepare you for translating knowledge about complex integrative, clinical physiology to a general audience. The purpose is NOT to provide a detailed, multi-page, graduate-level response.

Each "big picture" question is worth 2 points. 1 point is for answering the question. The other point is to ensure your answer relates to the question (e.g., if the big picture question is "How does cardiac output increase during exercise", the answer should relate to increasing heart rate and maintaining stroke volume but probably should not talk about how peanut butter is the greatest thing since (or on) sliced bread). Each applications & prescription topic will be worth 1 point; 0.5 points for completion, 0.5 points to ensure relevance.

The assignment will be completed on Canvas and due at the end of the semester (due date indicated in the *Schedule of Topics*). The assignment will be made available after the applications & prescription presentation topics are confirmed. After the submission date, de-identified answers can be posted (if desired) for the benefit of your classmates.

Performance

Attendance, Professionalism, and Participation, will be assessed on an ongoing basis throughout the term, as below. Near the end of the term, students will submit a self-assessment (with justification) of their performance through Canvas. These self-assessments will be reviewed and a final performance mark provided.

- *Attendance (2.5%)* – attendance will be recorded at the start of each class, and unexcused absences will be deducted
- *Professionalism (2.5%)* – punctuality, preparation, respectful language, responsibility for actions
- *Participation (5%)* – engagement in discussions, enthusiasm, initiative, pro-active work ethic
- ***Note that there is not one specific definition of "participation". Instead, course participation varies by student. You have the opportunity to advocate for your performance, but you will need to provide evidence and examples to support your self-assessment.*

Final exam

The final exam will be 40 marks total, consisting of 40 multiple choice questions (1 mark each). Format and content will be similar to KIN 562, with questions grouped into "case studies" as possible. The exam will be cumulative. The exam may include questions about the applications & prescription topics presented in class, but will not include questions about the "Experiences from the field". The exam will be completed on Canvas.

Like KIN 562, the final exam date will be determined based on your input. Similar to the KIN 562, the exam will be available for ~3-5 days. Once you start the exam, you will have 180 minutes to complete it.

GRADING SYSTEM – FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

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
0-59	F (Fail)

A minimum mark of 68% must be obtained in all courses taken by a student enrolled in a doctoral program.

The minimum passing grade in any course taken by a student enrolled in a master's program is 60%. However, only 6 credits of courses with grades in the C to C+ range (60-67%) may be counted towards a master's program. For all other courses, a minimum of 68% must be obtained.

Academic progress and grading practices are outlined on G+PS policies and procedures website.

UBC POLICY ON PLAGIARISM

All students should be aware of and follow UBC's Guidelines regarding Plagiarism. Please read and familiarize yourself with these guidelines. These policies are taken seriously by course instructors and program administrators.

POLICY ON LATE ASSIGNMENTS

Students are required to notify instructors at least 24 hours in advance if they are unable to meet deadlines for assignments. Students must then negotiate with the instructor a reasonable deadline for completion of course work.

ETHICAL AND PROFESSIONAL CONDUCT

Students are expected to adhere to standards of professional practice and ethics in their interactions with faculty, peers, and the public.

UNIVERSITY POLICIES

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on the UBC Senate website and Discrimination policy. For student accommodations, please see Access and Diversity.

ACADEMIC INTEGRITY

Students are expected to follow UBC policies for academic integrity and academic misconduct, which includes practices around plagiarism, referencing and citation, and copyright. For more see, UBC's Learning Commons Academic Integrity resources and graduate student misconduct in Graduate and Postdoctoral Studies.

GENERATIVE AI

Students are permitted to use artificial intelligence tools, including Generative AI (GenAI), to gather information, review concepts, or help produce assignments. Before using tools like GenAI, review UBC's guide on GenAI.

Students are ultimately accountable for the work they submit. Any content generated or supported by an artificial intelligence tool must be cited appropriately (see the UBC Library guide). Additionally, students must submit an appendix with their assignment detailing what tool(s) were used, how they were used, and how the results from the AI were incorporated into the submitted work. This includes detailing content produced by an artificial intelligence tool, and the prompt used to generate the content. Course instructors reserve the right to ask students to explain their process for creating their assignment.

Use of AI tools is not permitted during quizzes and exams in this course.

If students are unclear about the use of AI tools or applications for coursework, please speak with the instructor.

POLICY ON TEXT-MATCHING SOFTWARE

UBC subscribes to Turnitin, an online system that compares written material with the Web and with other material submitted to its database. Faculty, staff and students can upload submissions and check for duplication of material in other sources and possible plagiarism.

ACCESSIBILITY

If you have any challenges accessing materials that will impact your success in this course, UBC's Centre for Accessibility can support your needs by providing appropriate accommodations to support you.

- Web: UBC's Centre for Accessibility website
- Email: accessibility@ubc.ca

RESOURCES

Students requiring counselling services may contact UBC counselling services

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