



Land Acknowledgement

We respectfully acknowledge the Syilx Okanagan Nation and their peoples, in whose traditional, ancestral, unceded territory UBC Okanagan is situated.

HES 485: Advanced Circulatory Physiology

Faculty: Faculty of Health and Social Development

Department: Health and Exercise Sciences

Instructor: Dr. Glen Foster

Instructor Email: glen.foster@ubc.ca

Duration: Term 1 Winter 2023

Delivery Modality: Hybrid

Course Location: ART 281

Course Days: Thu

Class Hours: 11:00 am - 2:00 pm (**check weekly schedule to make sure you show up at the right time!**)

Office hours: By Appointment

Course Description

Regulation and adaptation of the circulatory systems at rest, during exercise. Focus on adaptations and prescription implications following pathology. Formerly offered as HMKV 414. Credit will be granted for only one of HES 485 or HMKV 414.

Course Format

Each learning module includes several pre-recorded lectures to be completed by the student prior to attending each week's, small group discussion led by the instructor. Students will have the opportunity during small group meetings to ask informal questions and are encouraged to contribute to the overall discussion both during in person meetings and via the online discussion board. Additionally, each learning module requires the completion of an assessment to test comprehension. Throughout the term, students working in small groups will complete a group assignment culminating in a class presentation.

Course Overview, Content and Objectives

This course is designed to provide a comprehensive overview of the essentials for circulatory physiology. Specifically, you will focus your learning to the regulation and adaptation of the circulatory systems at rest, during exercise and physiological stress. A special emphasis will be placed on scientific and medical

research to describe physiological function, exercise response and adaptations. Your attendance and active discussion in small group seminars and online discussion boards is critical to your success in this course. This 3-credit course extends your learning from HES 105 and HES 305 with a specific focus on the circulatory system, its function at rest and during exercise. This course will begin with a simple overview of the circulation and blood. From there we will focus on cardiac electrophysiology, automaticity, and pump function. Next, we will examine hemodynamics, arterial pressure regulation and the microcirculation. Finally, we will examine the coronary circulation and the clinical and applied consequence of right-to-left shunt. This course is composed of recorded lectures and discussion-based learning techniques. Additionally, students will work collaboratively in small groups and present a scientific debate to their classmates.

Learning Outcomes

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

1. Discuss and explain fundamental principles of circulatory physiology
2. Use concepts of circulatory physiology to explain pathological conditions or chronic disease
3. Outline an area of debate in circulatory physiology and recognize strengths and weaknesses of your argument

Assessments of Learning

1. Active participation in small group discussions, discussion forums, and debates (LO1, LO2) - 20 %
2. Learning module assessments (LO1, LO2) - 50 %
3. Group assignment and presentation (LO3) - 30 %

Learning Activities

1. Students are required to access and review lecture recordings each week in advance of small group meetings.
2. Groups will meet during our scheduled lecture time on **Thursdays, 11:00 am – 2:00 pm**. Each small group discussion will meet for up to 60 minutes.
3. Each grouping of students will be required to work collaboratively to research and present a scientific debate to their peers. Group presentations will be delivered to the entire class as scheduled throughout the term during our weekly in person meetings.
4. Comprehension of course content will be assessed weekly in the form of a quiz which must be completed by **11:59 pm each Monday**.
5. An online discussion board will serve as another opportunity for students to reflect on their learning (**due each Monday by 11:59 pm**).

Course schedule

	Topics and/or exam (quiz, midterm, final)	Required Reading (s) and/or Videos	Learning Outcome
Week 1 Sept 4-8	<u>Course Overview; Overview of the Circulatory System</u> <i>Whole Class, <u>Thursday @ 11:00 am</u></i>		LO1, LO2

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<p>Week 2 Sept 11-15</p>	<p><u>Cardiac Electrophysiology</u> Small Group Discussions “in Person” on Thursday <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <u>Complete Quiz by Monday, Sept 18 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. In preparation for your group assignments please watch: How to run a debate! Don’t forget to contribute each week to the small group discussion and the online discussion board (by Monday Sept 18 @ 11:59 pm!)</p>	<p>LO1, LO2</p>
<p>Week 3 Sept 18-22</p>	<p><u>Cardiac Automaticity, Conduction, Electrocardiogram</u> Small Group Discussions “in Person” on Thursday <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 1 - 2 @ 12:00 pm</i> <u>Complete Quiz by Monday, Sept 25 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (by Monday Sept 25 @ 11:59 pm!)</p>	<p>LO1, LO2</p>
<p>Week 4 Sept 25-29</p>	<p><u>Cardiac Pump</u> Small Group Discussions “in Person” on Thursday <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <u>Complete Quiz by Monday, Oct 2 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (by Monday, Oct 2 @ 11:59 pm!)</p>	<p>LO1, LO2</p>
<p>Week 5 Oct 2-6</p>	<p><u>Arterial System</u> Small Group Discussions “in Person” on Thursday <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 1 - 2 @ 12:00 pm</i> <u>Complete Quiz by Monday, Oct 9 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (by Monday, Oct 9 @ 11:59 pm!)</p>	<p>LO1, LO2</p>
<p>Week 6 Oct 9-13</p>	<p><u>No Class</u> – Opportunity provided to connect with your groups in preparation for your group assignments</p>	<p>Classroom available as a meeting location during scheduled class time.</p>	<p>LO3</p>

<p>Week 7 Oct 16-20</p>	<p><u>Hemodynamics</u> Small Group Discussions “in Person” on Thursday <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <u>Complete Quiz by Monday, Oct 23 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (<u>by Monday, Oct 23 @ 11:59 pm</u>)!</p>	<p>LO1, LO2</p>
<p>Week 8 Oct 23-27</p>	<p><u>Peripheral Circulation</u> Small Group Discussions “in Person” on Thursday <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 1 - 2 @ 12:00 pm</i> <u>Complete Quiz by Monday, Oct 30 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (<u>by Monday, Oct 30 @ 11:59 pm</u>)!</p>	<p>LO1, LO2</p>
<p>Week 9 Oct 30- Nov 3</p>	<p>Group Assignment (Groups 1 - 2) <i>Whole Class – Thursday @ 11:00 am</i> <u>Groups 1 & 2 complete and submit peer review by 5:00 pm</u></p>	<p>Read: Acute exercise elicits damage to the endothelial layer of systemic blood vessels in healthy individuals</p> <p><i>Please read all 4 letters</i> <i>And if available comments, and last words</i> <i>Attendance and participation are required!</i></p>	<p>LO3</p>
<p>Week 10 Nov 6-10</p>	<p><u>Right-to-left Shunt</u> Small Group Discussions “in Person” on Thursday <i>Groups 1 - 2 @ 11:00 am</i> <i>Groups 3 - 4 @ 12:00 pm</i> <u>Complete Quiz by Monday, Nov 13 @ 11:59 pm</u></p>	<p>Recorded lecture modules available on Canvas. Don’t forget to contribute each week to the small group discussion and the online discussion board (<u>by Monday, Nov 13 @ 11:59 pm</u>)!</p>	<p>LO1, LO2</p>
<p>MIDTERM BREAK NOV 13 – 17</p>	<p>No Classes or Material This Week!</p>	<p>Finish assessments from previous week due by <u>Monday, Nov 13th, @ 11:59 pm.</u></p>	
<p>Week 12 Nov 20-24</p>	<p><u>Group Assignment</u> (Groups 3 - 4) <i>Whole Class – Thursday @ 11:00 am</i></p>	<p>Read: Most of the cardiovascular consequences of OSA are/are not due to increased sympathetic activity</p>	<p>LO3</p>

	<u>Groups 3 - 4 complete and submit peer review by 5:00 pm</u>	<i>Please read all 4 letters And if available comments, and last words Attendance and participation are required!</i>	
Week 13 Nov 27-Dec 1	<u>Coronary Circulation</u> Small Group Discussions "in Person" on Thursday <i>Groups 3 - 4 @ 11:00 am</i> <i>Groups 1 - 2 @ 12:00 pm</i> <u>Complete Quiz by Monday, Dec 4 @ 11:59 pm</u>	Recorded lecture modules available on Canvas. Don't forget to contribute each week to the small group discussion and the online discussion board (by Monday, Dec 4 @ 11:59 pm)!	LO1, LO2
Week 14 Dec 4-Dec 8	No Class – classes end Dec 7th.	Finish assessments from previous week due by Monday, Dec 4th, @ 11:59 pm.	

Late policy

Late submissions will receive a grade of zero unless prior arrangements have been made and approved by the course instructor.

Missed exam policy

Missed exams will receive a grade of zero unless prior arrangements have been made and approved by the course instructor.

Missed Activity Policy:

Failure to participate in small group discussions and online discussion board will receive a grade of zero unless prior arrangements have been made and approved by the course instructor.

Other Course Policies

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 usually result in a failing grade or mark of zero on the assignment or in the course.** Careful records are kept to monitor and prevent recidivism.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at:

<http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,54,111,0>

Final Examinations

You can find the [Senate-approved term and examination dates here](#). Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 27-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>

Grading Practices

Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to University, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record.

<http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014>

Resources to Support Student Success:

UBC Okanagan Disability Resource Centre

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 at:

UNC 215 250.807.8053

Email: drc.questions@ubc.ca

Web: www.students.ok.ubc.ca/drc

UBC Okanagan Equity and Inclusion Office

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.

UNC 325H 250.807.9291

Email: equity.ubco@ubc.ca

Web: www.equity.ok.ubc.ca

Student 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.

UNC 337 250.807.9270

Email: healthwellness.okanagan@ubc.ca

Web: www.students.ok.ubc.ca/health-wellness

Office of the Ombudperson

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. If you require assistance, please feel free to reach out for more information or to arrange an appointment.

UNC 328 250.807.9818

Email: ombuds.office.ok@ubc.ca

Web: www.ombudsoffice.ubc.ca

Student Learning Hub

The Student Learning Hub is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include **tutoring in math, sciences, languages, and writing, as well as help with study skills and learning strategies**. Students are encouraged to visit often and early to build the skills, strategies and behaviors that are essential to being a confident and independent learner. For more information, please visit the Hub's website.

LIB 237 250.807.8491

Email: learning.hub@ubc.ca

Web: www.students.ok.ubc.ca/slh

The Global Engagement Office

The Global Engagement Office provides advising and resources to assist International students in navigating immigration, health insurance, and settlement matters, as well as opportunities for intercultural learning, and resources for Go Global experiences available to all UBC Okanagan students, and more.

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Come and see us – we are here to help! You may also contact geo.ubco@ubc.ca

Safewalk

*Don't want to walk alone at night? Not too sure how to get somewhere on campus? Call Safewalk at **250-807-8076**.*

For more information, see: www.security.ok.ubc.ca

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